U.S. Army Center for Health Promotion and Preventive Medicine

U

S

TRAINING MUNITIONS HEALTH RISK ASSESSMENT
NO. 39-EJ-1485-00
RESIDENTIAL EXPOSURE FROM INHALATION OF
AIR EMISSIONS FROM THE
M855 5.56-MM TUNGSTEN BALL CARTRIDGE
DEPARTMENT OF DEFENSE IDENTIFICATION CODE: A059



Prepared by:

Environmental Health Risk Assessment Program

Prepared for:

U.S. Army Environmental Center

Published date:

4 June 2001

Approved for public release; distribution unlimited

C

 \mathbf{H}

P

P

20011102 141

M

Readiness Thru Health

U.S. Army Center for Health Promotion and Preventive Medicine

The lineage of the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) can be traced back over 50 years. This organization began as the U.S. Army Industrial Hygiene Laboratory, established during the industrial buildup for World War II, under the direct supervision of the Army Surgeon General. Its original location was at the Johns Hopkins School of Hygiene and Public Health. Its mission was to conduct occupational health surveys and investigations within the Department of Defense's (DOD's) industrial production base. It was staffed with three personnel and had a limited annual operating budget of three thousand dollars.

Most recently, it became internationally known as the U.S. Army Environmental Hygiene Agency (AEHA). Its mission expanded to support worldwide preventive medicine programs of the Army, DOD, and other Federal agencies as directed by the Army Medical Command or the Office of The Surgeon General, through consultations, support services, investigations, on-site visits, and training.

On 1 August 1994, AEHA was redesignated the U.S. Army Center for Health Promotion and Preventive Medicine with a provisional status and a commanding general officer. On 1 October 1995, the nonprovisional status was approved with a mission of providing preventive medicine and health promotion leadership, direction, and services for America's Army.

The organization's quest has always been one of excellence and the provision of quality service. Today, its goal is to be an established world-class center of excellence for achieving and maintaining a fit, healthy, and ready force. To achieve that end, the CHPPM holds firmly to its values which are steeped in rich military heritage:

- **★** Integrity is the foundation
 - ★ Excellence is the standard
 - ★ Customer satisfaction is the focus
 - ★ Its people are the most valued resource
 - ★ Continuous quality improvement is the pathway

This organization stands on the threshold of even greater challenges and responsibilities. It has been reorganized and reengineered to support the Army of the future. The CHPPM now has three direct support activities located in Fort Meade, Maryland; Fort McPherson, Georgia; and Fitzsimons Army Medical Center, Aurora, Colorado; to provide responsive regional health promotion and preventive medicine support across the U.S. There are also two CHPPM overseas commands in Landstuhl, Germany and Camp Zama, Japan who contribute to the success of CHPPM's increasing global mission. As CHPPM moves into the 21st Century, new programs relating to fitness, health promotion, wellness, and disease surveillance are being added. As always, CHPPM stands firm in its commitment to Army readiness. It is an organization proud of its fine history, yet equally excited about its challenging future.

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

				ding the t	time for reviewing instructions	, searching existing data sources,
The public reporting burden for this collection of info gathering and maintaining the data needed, and complete information including suggestions for reducing	rmation is eleting and re	estimated to average 1 hour pe eviewing the collection of inform to Department of Defense.	r response, incluination. Send con Washington Hea	aing the t iments re dquarters	garding this burden estimate of Services, Directorate for In	r any other aspect of this collection formation Operations and Reports
of information, including suggestions for reducing (0704-0188), 1215 Jefferson Davis Highway, Suite 1 subject to any penalty for failing to comply with a coll	204, Arling	ton, VA 22202-4302. Resport	dents should be currently valid O	aware the	at notwithstanding any other polynomials	rovision of law, no person shall be
PLEASE DO NOT RETURN YOUR FORIVI	IO ITE	ABOVE ADDITESS.				
1. REPORT DATE (DD-MM-YYYY) 2. 06/15/2001	REPORT	Technical Rep	ort		3. DATES COVERE March 19	99-August 2001
4. TITLE AND SUBTITLE				5a. C0	ONTRACT NUMBER	
Training Munitions Health Risk Asse	ssment	No.39-EJ-1485-00	MOSE			ļ
Residential Exposure from Inhalation 5.56mm Tungsten Ball Cartridge, Do	of the A	AIT EMISSIONS FROM the of Defeatise Identific	cation	5b. Gi	RANT NUMBER	
Code: A059	charanci	at of Delesine Identific			-	
				Sc DE	ROGRAM ELEMENT NU	MBER
				JC. 11	HOOHAM ELLMENT NO	
				בן הי	ROJECT NUMBER	
6. AUTHOR(S) Joleen Mobley, Stafford D.F.R.Coak	lev			sa. Pl	MUJECI NUMBER	
Juicen Mouley, Station D.F.R.Coan	ucy					
				5e. T	ASK NUMBER	
· ·						
			•	5f. W	ORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAM	E(S) AND	ADDRESS(ES)			8. PERFORMING OF REPORT NUMBER	
U.S. Army Center for Health Promo 5158 Blackhawk Road	tion and	Preventive Medicine				
Aberdeen Proving Ground, Maryland	d 21010-	-5422			Risk Assessi	nent # 39-EJ-1485-00
9. SPONSORING/MONITORING AGENC	Y NAME	(S) AND ADDRESS(ES)			10. SPONSOR/MOI	VITOR'S ACRONYM(S)
U.S. Army Environmental Center						USAEC
ATTN: SFIM-AEC-PC Aberdeen Proving Ground, MD 21010-5401 11. SPONSOR/MONITOR'S REPORT				NITODIC DEPORT		
Abeldeen Flowing Ground, M.D. 22010 First		NUMBER(S)				
					SFIM-Al	EC-PC-CR-200153
12. DISTRIBUTION/AVAILABILITY STATEMENT						
Distribution Unlimited						
13. SUPPLEMENTARY NOTES Point of Contact: Tamera Rush 416)-436-68	349				
1 One of Common America and the test of the						
14. ABSTRACT						o following use of the
This assessment evaluated the potent 5.56mm Tungsten Ball Cartridge.	tial for h	uman health effects to	offsite residuation of the	gents b	oreathing air emission ntial for adverse hum	s ronowing use of the an health effects to teh
affaita racidante breathing air emissi	one follo	nwing the use of milit	ary firing r	anges (during training exerci	ses. Singly leading anower
Itipl for health ricke to the b	wnothet	ical resident from unha	ilation of air	emissi	ions from the 3.30iiii	i Cartriage. To conduct
this study, air emissions from the 5.	n air dic	nersion model to deter	mine ambie	nt air c	concentrations at a 100	ation downwhite nom me
This information was then used in an air dispersion model to determine ambient air concentrations at a location downwind from the site where the item was activated. Modeled air concentrations were combined with exposure information to estimate the amount of the site where the item was activated.						
substances the hypothetical resident breathes. This intake was combined with the substance's health information, to determine if there is a potential for health risks from inhjalation of these substances. The health risk included both long-term and short term						
exposures to the modeled substance concentrations. Study results showed no potential for helath risks from inhalation of air						
emissions from the 5.56mm Tungsten Ball Cartridge.						
15. SUBJECT TERMS emissions, aberdeen test center, cha	racteriz	ation, health risk, mur	itions. firin	g point	t, green ammo, tungsi	en
emissions, averdeen lest center, cha	uvivi iL	mulan, and makes allows, assume	,			
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF	18. NUMBER		NAME OF RESPONSIBI	E PERSON
a. REPORT b. ABSTRACT c. THIS	S PAGE	ABSTRACT	OF PAGES		era Rush	
	U	บบ	,,,,,,,,	19b.	TELEPHONE NUMBER	Include area code) 66-6849



DEPARTMENT OF THE ARMY U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE 5158 BLACKHAWK ROAD ABERDEEN PROVING GROUND, MARYLAND 21010-5422

MCHB-TS-EHR

TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE M855 5.56-MM TUNGSTEN BALL CARTRIDGE

EXECUTIVE SUMMARY

This assessment evaluated the potential for human health effects to offsite residents breathing air emissions following use of the M855 5.56-mm Tungsten Ball Cartridge (Tungsten M855) on firing ranges during training exercises.

To conduct this study, air emissions from the Tungsten M855 were collected in a test chamber at the U.S. Army Aberdeen Test Center, Maryland. The data collected from the Firing Point Emission Study provided the amount and types of substances released from the Tungsten M855. This information was then used in an air dispersion model to determine ambient air concentrations at locations downwind from the Tungsten M855 firing location. Since the training facility in this study is hypothetical, the air model used assumptions that provided conservative estimates of air concentrations.

Modeled air concentrations were combined with exposure information (e.g., number of cartridges used per year) to estimate the amount of each substance the hypothetical resident breathes. This estimate was then compared with the substance's health-based screening level, which was obtained from agencies such as the U.S. Environmental Protection Agency, to determine if there is a potential for health risks from inhalation.

The health risk study included both long-term (30 years) and short-term (15-minute or 1-hour) exposures to modeled substance concentrations. Study results, generated using conservative methods, showed that the hypothetical offsite resident breathing air as close as 300 meters (984 feet) from the firing location is safe from these emissions. At locations closer than 300 meters from the firing location, a more site-specific evaluation is necessary. It should be noted that at most training installations, training areas are over 1,000 meters (over half a mile) away from populated areas.

TABLE OF CONTENTS

1.	PURPOSE	1
2.	AUTHORITY	1
3.	REFERENCES	1
4.	BACKGROUND	1
	4.1 CARTRIDGES AND THEIR USE	1
	4.2 WHAT IS THE TUNGSTEN M855?	1
	4.3 USE OF THE TUNGSTEN M855	2
	4.4 ASSESSMENT SUMMARY	2
5.	DATA COLLECTION AND AIR MODELING	3
	5.1 EMISSION FACTORS	3
	5.2 BACKGROUND AND DESCRIPTION	3
	5.3 MODEL ASSUMPTIONS	3
	5.4 GENERAL METHODOLOGY	5
	5.5 USE OF MODEL OUTPUT	5
	5.6 DETERMINATION OF SUBSTANCE-SPECIFIC EMISSION RATES	6
6.	RISK ASSESSMENT	7
	6.1 EXPOSURE ASSUMPTIONS	7
	6.2 TIME-AVERAGING	7
	6.3 TOXICITY ASSESSMENT	10
7.	RISK CHARACTERIZATION	14
	7.1 CHRONIC HEALTH RISK	14
	7.2 ACUTE HEALTH RISK	15
	7.3 FACT SHEET	15

8.	UNCERTAINTY DISCUSSION	16
9.	CONCLUSION	18
10	. RECOMMENDATIONS	18
11	POINT OF CONTACT	18

LIST OF APPENDICES

REFERENCES	. APPENDIX A
AIR DISPERSION MODELING OUTPUT DATA	. APPENDIX B
HEALTH-BASED SCREENING LEVELS AND ACUTE TOXICITY VALUES	. APPENDIX C
RISK EVALUATION DATA	. APPENDIX D
FACT SHEET SUBMITTED TO AEC	. APPENDIX E
LIST OF TABLES	
TABLE 1 – SOURCE PARAMETERS	4
TABLE 2 – WORST-CASE METEOROLOGICAL PARAMETERS	5
TABLE 3 – AIR MODEL INPUT PARAMETERS	5
TABLE 4 – FREQUENCY OF USE FOR THE TUNGSTEN M855	7
TABLE 5 – EXPOSURE PARAMETERS USED TO DETERMINE TIME-AVERAGED CHRONIC AIR CONCENTRATIONS	8
TABLE 6 – SUMMARY OF RfCs USED FOR PETROLEUM HYDROCARBONS	12
TARLE 7 TYPES OF LINCERTAINTY	17

LIST OF ACRONYMS

AEC U.S. Army Environmental Center

AEGL Acute Exposure Guideline Levels

AIHA American Industrial Hygiene Association

Al Aluminum

ATC U.S. Army Aberdeen Test Center

ATV Acute Toxicity Value

DODIC Department of Defense Identification Code

DOE U.S. Department of Energy

EPA U.S. Environmental Protection Agency

ERPG Emergency Response Planning Guidelines

HBSL Health-Based Screening Level

INPUFF Integrated PUFF Model

NAAQS National Ambient Air Quality Standards

NEW Net Explosive Weight

NH₃ Ammonia

OEL Occupational Exposure Limit

PM₁₀ Particulate Matter under 10 microns in size

PRG Preliminary Remediation Goals

RBC Risk-Based Concentration

RfC Reference Concentration

TEEL Temporary Emergency Exposure Limits

TPH Total Petroleum Hydrocarbons

TSP Total Suspended Particulates

USACHPPM U.S. Army Center for Health Promotion and Preventive Medicine

TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE M855 5.56-MM TUNGSTEN BALL CARTRIDGE

1. PURPOSE

This document presents the assessment of the potential for human health effects to offsite residents breathing air emissions following use of the M855 5.56-mm Tungsten Ball Cartridge (Tungsten M855) on firing ranges during training exercises.

2. AUTHORITY

Statement of Work, 30 November 2000, Training Munitions Inhalation Health Risk Evaluations.

3. REFERENCES

See Appendix A for a list of references.

4. BACKGROUND

4.1 CARTRIDGES AND THEIR USE

Cartridges are cases that contain a primer, propelling charge, and projectile. The primer is needed to activate the propelling charge, which provides the force to send the projectile to a target. Examples of projectiles include bullets, rockets, and missiles. Cartridges are also referred to as "rounds" and are fired from weapons such as pistols or rifles.

4.2 WHAT IS THE TUNGSTEN M855?

The Tungsten M855 is a type of ball ammunition, which means that it is intended for use against unarmored targets. This cartridge is used on firing ranges during training. Each cartridge is about as long as a man's thumb and weighs about as much as a half dollar coin. It can be identified by its green tip (Reference 1).

The Tungsten M855 is a variation of the original M855 and came into production in 1999. The difference between the two different M855 versions is the bullet composition. The Tungsten M855 bullet consists of a copper alloy jacket with tungstentin or tungsten-nylon whereas the original M855 bullet consists of a copper alloy jacket with a steel penetrator and a lead-antimony slug. The Tungsten M855 was developed to mitigate lead contamination problems on training ranges while maintaining the combat effectiveness of the earlier version.

4.3 USE OF THE TUNGSTEN M855

The Tungsten M855 is typically fired from the M249 machine gun or the M16A2 rifle (Reference 2). Training with the Tungsten M855 is very important because it allows our troops to practice using weapons and prepare them for combat situations. In addition, the Tungsten M855 bullet is free of lead and therefore reduces lead contamination of training ranges.

4.4 ASSESSMENT SUMMARY

The general assessment approach consisted of two main parts: air dispersion modeling and exposure assessment, which are briefly discussed in the paragraphs below. Sections 5 through 7 present a discussion of the methodology used for this study.

Emissions data used in the air dispersion modeling were obtained from the Firing Point Emission Study, conducted by the U.S. Army Aberdeen Test Center (ATC), at Aberdeen Proving Ground, Maryland (Reference 3). This study was funded by the U.S. Army Environmental Center (AEC) with the purpose of identifying and quantifying emissions from weapons firing. Data from this study were generated by firing munitions in a test chamber using weapons that are representative of those used by the U.S. Army during training operations. Emissions data for the Tungsten M855 were generated by firing it from the M16A2 rifle.

The emissions data for the Tungsten M855 were used with an atmospheric dispersion model to estimate the average concentrations that might be experienced by an offsite resident. Since this study is designed to provide results that would be applicable to most Army training facilities, the training area used in this assessment was a hypothetical one. While most training areas are at least 1,000 meters away from populated areas, as a conservative distance, it was initially assumed that a person could reside 100 meters downwind from the firing point (location where the rifle is positioned). In addition, air-modeling parameters were selected to mimic worst-case conditions.

The exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. For the purpose of this study, air concentrations were averaged over 30 years for chronic exposures and 1-hour or 15 minutes for acute exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic health-based screening levels (HBSLs) established by the U.S. Environmental Protection Agency (EPA) or acute toxicity values (ATVs) established by selected agencies depending on the exposure duration (i.e., 30 years versus 1-hour or 15 minutes). The comparison was made using the ratio of the HBSL or ATV to the estimated air concentration for each of the substances evaluated. If this ratio was less than one, no further evaluation was required. This approach is conservative because the exposure assumptions used

by the agencies, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near firing ranges. If the chronic or acute averaged concentrations (C_{chronic} and C_{acute}) were greater than the screening levels, producing a ratio greater than one, further evaluation would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather, the potential for such.

5. DATA COLLECTION AND AIR MODELING

5.1 EMISSION FACTORS

Emission factors, used to derive the air modeling emission rates used in this study, were generated from the Firing Point Emission Study conducted by the ATC (Reference 3). The data included the net explosive weight (NEW), the substances sampled, and substance-specific emission factors. Emissions data from the Firing Point Emission Study are included in the first five columns of the table located in Appendix B.

5.2 BACKGROUND AND DESCRIPTION

Air dispersion models are available to mathematically simulate plume behavior and to estimate downwind concentrations of substances emitted from various sources. However, specific models are not available to determine the dispersion of emissions from munitions used during training. Estimating the magnitude and location of these concentrations depends on many factors including the amount and type of emissions, the behavior of the source, and meteorological conditions. Since a specific model is not available for modeling the use of munitions during training, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) evaluated numerous air models to determine which would be suitable for use with munitions used during training. The USACHPPM recommended using the Integrated PUFF (INPUFF) model to estimate the dispersion of emissions from various munitions sources (Reference 4).

The INPUFF Model (Reference 5) was developed to simulate dispersion from instantaneous or semi-continuous point sources. This Gaussian-integrated puff model is capable of addressing a cloud type release over short periods of time, and computations can be performed for a single point source for multiple receptors. The algorithms used to calculate concentrations assume a vertically uniform wind direction (with no chemical reaction) to compute the contribution of each cloud at a receptor for each time step/interval.

5.3 MODEL ASSUMPTIONS

Some assumptions were made to best represent the firing of the Tungsten M855 cartridges. These assumptions were as follows:

> Typically, with conventional point sources (such as incinerators), the cloud rise and formation are determined by characterizing flue gas exit velocity,

temperature, and stack diameter. However, the M855 cartridges are used in conjunction with machine guns and rifles. For unconventional sources with no real physical stack dimensions, such as rifles, the stack height and diameter were assumed to be equal to the height of the barrel and the bore diameter. No exit velocity was used with this source because the emission rates generated from the test data were obtained from sampling a stabilized cloud with no exit velocity. Table 1 includes the source parameters used to model the Tungsten M855 cartridges.

TABLE 1: SOURCE PARAMETERS

Parameter	Model Input
Source/Stack Diameter	0.00556 meters
Source/Stack Height	1 meter
Source Exit Temperature	298.15 degrees Kelvin (°K) (or 77 °F)
Exit Velocity	0 meters/second
Initial horizontal dispersion coefficient (σ_y)	2.29 meters
Initial vertical dispersion coefficient (σ_z)	1.07 meters

- Initial cloud dimensions are preferred to model the air emissions from these types of releases. Typically, these dimensions are used to define the initial horizontal and vertical dispersion values (σ_y and σ_z) of the released cloud. However, this information was not measured during the studies at the ATC; therefore, the cloud dimensions were based on the test chamber dimensions and the volume of air sampled. By assuming an elliptical cloud with the prevailing wind direction being perpendicular to the muzzle when fired, the test chamber's radius would be equal to the initial vertical dispersion (σ_z), and the initial horizontal dispersion (σ_y), would be equal to one half the length of the test chamber. The cloud exit temperature was assumed to be equal to the test chamber temperature.
- ➤ For the purposes of this study, a hypothetical offsite resident was assumed to be located first at 100 meters, then at 200 and 300 meters directly downwind from the source. The meander of the cloud is a major factor when estimating concentrations at given locations downwind from the source. Assuming that the resident is directly downwind from the source is the same as assuming that there is no cloud meander and that the center of the cloud migrates directly over the hypothetical offsite resident. This assumption provides the most conservative modeled concentrations.
- Since this study does not look at a specific training site, generic, worst-case meteorological data were used. To determine the worst-case meteorological conditions that would result in the highest ambient air concentrations, the modeling was performed using the EPA Risk Management Program Guidance (Reference 6). This guidance includes tables for estimating the footprint of

chemical releases and is intended to inform emergency responders of potential accidental releases. The EPA has defined most default conditions for meteorological modeling parameters. Table 2 lists the meteorological parameters that were used in the air model.

TABLE 2: WORST-CASE METEOROLOGICAL PARAMETERS

Parameter	Input Value		
Wind Speed	1 meter/second		
Atmospheric Stability	Category F		
Wind Direction	270°		
Ambient Temperature	293 degrees Kelvin (°K) (or 68 °F)		

5.4 GENERAL METHODOLOGY

The model was run for a total calculation time of 200 seconds for the 100-meter location and 400 seconds for the 200 and 300-meter locations. This was done to simulate a single round being fired and to ensure that the total mass of the cloud had passed the hypothetical resident locations. Concentrations were calculated every 2 or 4 seconds, depending on the location being modeled. The model results indicated that the initial cloud reached the hypothetical offsite resident at 300 meters within 242 seconds and dissipated below the lowest concentration the model calculated (1 x 10^{-12} g/m³) within 394 seconds. Table 3 contains the air model input parameters used in this study.

TABLE 3: AIR MODEL INPUT PARAMETERS

Parameter	Input Value		
Falailletei	100 meters	200 meters	300 meters
Number of meteorological periods (NTIME)	1	1	1
Duration of each meteorological period (ITIME)	200 seconds	400 seconds	400 seconds
Number of updates to the source (NSRCDS)	100	100	100
Duration/time step between each source update (ISUPDT)	2 seconds	4 seconds	4 seconds
Total time modeled/Simulation Period (NTIME) (ITIME)= (NSRCDS) (ISUPDT)	200 seconds	400 seconds	400 seconds

5.5 USE OF MODEL OUTPUT

The concentrations provided by the INPUFF model were based on a unit emission rate (ER_{unit}) of 1 gram/second from an emission source, and did not represent any substance-specific concentrations from the use of any weapons system. This unit emission rate is typically used for ease of modeling purposes. The relationship between the emission rate and predicted concentration is linear. Therefore, the ratio of the

predicted concentration to the unit emission rate was multiplied by each substancespecific emission rate to provide substance-specific concentrations.

5.6 DETERMINATION OF SUBSTANCE-SPECIFIC EMISSION RATES

The actual substance emission rate for one item (ER₁) for each substance was calculated using Equation 1. Example 1 contains a sample calculation using this equation.

$$ER_1 = \frac{EF \cdot CV}{t}$$
 Equation 1

Where:

 ER_1 = emission rate for one item ((g/item)/sec)

EF = average adjusted emission factor (lb/item)

CV = conversion factor (453.59 g/lb)

t = release duration obtained from the INPUFF model (sec)

Example 1 Sample Calculation Using Equation 1:

$$ER_1 = \frac{(2.48 E - 05)(453.59)}{(4)}$$

= 2.808 E-03 g/sec

Calculation provided for ammonia (NH_3) at the 300-meter location. Appendix B provides the average adjusted emission factor of NH_3 in lb/item.

Substance-specific ambient concentrations for one item (CONC) were calculated using Equation 2. A sample calculation using this equation is provided in Example 2. Appendix B contains the estimated air concentrations for the 100, 200, and 300-meter locations.

$$CONC = ER_1 \cdot \frac{UC}{ER_{unit}}$$
 Equation 2

Where:

CONC = substance concentration based on one item (g/m³)

 ER_1 = emission rate for one item (g/sec)

 ER_{unit} = unit emission rate as used in the model (g/sec)

UC = concentration based on the unit emission rate (g/m³)

Example 2 Sample Calculation Using Equation 2:

$$CONC = (2.808E - 03) \frac{(4.236E - 05)}{(1)}$$

 $= 1.189E-07 g/m^3$

Calculation provided for NH₃ at the 300-meter location.

6. RISK ASSESSMENT

6.1 EXPOSURE ASSUMPTIONS

Exposure assumptions for the Tungsten M855 were selected using a typical use scenario for the original M855 during training exercises. It was assumed that the Tungsten M855 would be used in the same manner as the original M855. The typical use scenario was provided by the AEC and is based on consultation with their senior training advisor (References 7, 8). The frequency of use for the Tungsten M855 was required to determine how much substance an offsite resident would be exposed to in the time period of interest (i.e., acute or chronic exposure). Table 4 summarizes the general use scenario for the Tungsten M855.

TABLE 4: FREQUENCY OF USE FOR THE TUNGSTEN M855

Parameter	Value Used
Number of cartridges used per year	1,440,622
Maximum number of cartridges used in one hour	1,000

6.2 TIME-AVERAGING

For the chronic assessment, time-averaged concentrations were calculated by assuming that the hypothetical resident would be exposed for 30 years. This is consistent with the exposure duration used by the EPA, which assumes that the resident spends 30 years at the same residence. By using the same exposure duration, the estimated time-averaged concentrations were compared with the selected HBSLs, which were derived using standard EPA default assumptions.

Using the default residence time established by the EPA, the assumption was made that someone could be exposed to emissions from 1,440,622 cartridges per year for 30 years. Table 5 lists the exposure parameters used to estimate concentrations for the chronic assessment. These parameters are based on the typical use scenario provided by the AEC (Table 4) and the assumptions used in the air model run.

TABLE 5: EXPOSURE PARAMETERS USED TO DETERMINE TIME-AVERAGED CHRONIC AIR CONCENTRATIONS

Exposure Parameter	Value Used			
Exposure Parameter	100 meters	200 meters	300 meters	
Exposure Time (ET _{ctg})	3.33 min/cartridge ¹	6.67 min/cartridge ¹	6.67 min/cartridge ¹	
Exposure Frequency (EF _{ctg})		,622 cartridges		
Exposure Duration (ED)		30 years ²		

¹Based on the total model time of 200 seconds (3.33 minutes) or 400 seconds (6.67 minutes) used in the air model run. Refer to Table 3 for the Air Model Input Parameters. ²EPA default value.

Chronic averaged concentrations were calculated using Equation 3. Example 3 shows how this calculation was performed using the total suspended particulates (TSP) concentration at 300 meters as an example. Since TSP is classified as a noncarcinogen, the averaging time (AT) is the same as the exposure duration.

$$C_{chronic} = \frac{CONC \cdot 10^6 \cdot ET_{ctg} \cdot EF_{ctg} \cdot ED}{525,600 \cdot AT}$$
 Equation 3

Where:

 $C_{chronic}$ = average chronic concentration (μ g/m³)

CONC = average modeled concentration for one cartridge (g/m³)

 10^6 = unit conversion (µg/g)

 ET_{ctg} = exposure time per cartridge (minutes/cartridge) EF_{ctg} = exposure frequency per year (cartridges/year)

ED = exposure duration (years) 525,600 = unit conversion (minutes/year)

AT = averaging time (years)

(carcinogenic endpoint: AT = 70 years noncarcinogenic endpoint: AT = ED)

Example 3 Sample Calculation Using Equation 3:

$$C_{chronic(TSP)} = \frac{(2.117 \text{E} - 07)(10^6)(6.667)(1,440,622)(30)}{(525,600)(30)}$$

 $= 3.87E+00 \mu g/m^3$

Appendix B provides the average modeled concentration for one cartridge (CONC). Table 5 includes the exposure parameters.

Unlike the chronic assessment, only limited guidance for evaluating acute exposures is currently available. Since many cartridges may be fired in a short period of time, however, acute exposures cannot be overlooked. For the purpose of this study, acute exposure is defined as a 1-hour or 15-minute exposure. The 1-hour or 15-minute acute exposure averaging times allow for comparison with guidelines developed specifically for emergency planning purposes (refer to the discussion on acute toxicity below).

The exposure frequency is based on the number of cartridges used per 1-hour or 15 minutes depending on the guideline used for comparison. This information is based on the use scenario provided in Table 4. To estimate air concentrations for potential acute health effects, it was conservatively assumed that 1,000 Tungsten M855s are fired in one hour. The average acute concentrations were computed using Equation 4. Example 4 contains a sample calculation at 300 meters using this equation. Since TSP does not have an ATV, aluminum (AI) is used as the example substance.

$$C_{acute} = \frac{CONC \cdot 10^6 \cdot ET_{ctg} \cdot EF_{ctg}}{60}$$
 Equation 4

Where:

 C_{acute} = average acute concentration ($\mu g/m^3$)

CONC = average modeled concentration for one cartridge (g/m³)

 10^6 = unit conversion (µg/g)

ET_{ctq} = exposure time per cartridge (minutes/cartridge)

 EF_{cta} = exposure frequency (cartridges/hour)*

= unit conversion (minutes/hour)

* Based on 1-hour or 15 minute (0.25 hour) ATV

Example 4 Sample Calculation Using Equation 4:

$$C_{acute(Al)} = \frac{(1.087E - 09)(10^6)(6.667)(1,000/0.25)}{60}$$
$$= 4.83E-01 \, \mu g/m^3$$

Appendix B provides the average modeled concentration for one cartridge (CONC) for Al.

6.3 TOXICITY ASSESSMENT

The potential for health effects was determined by comparing time-averaged air concentrations to HBSLs and ATVs, which are developed from a substance's known toxicity. These toxicity values typically include different levels of safety factors depending on the level of confidence of the critical study. Appendix C contains a table of screening toxicity values used for the chronic and acute assessments.

6.3.1 CHRONIC ASSESSMENT

The chronic assessment was evaluated using a screening approach. Using this method, a substance's estimated time-averaged air concentration was compared to its HBSL by using the ratio of the HBSL to the estimated concentration. If this ratio was less than one, no further evaluation was necessary. This approach is conservative because the exposure assumptions used by the EPA, to establish HBSLs, assume that the resident is continuously exposed for 350 days per year (assuming 2 weeks vacation per year). In contrast, exposure to air emissions from actual training activities at a firing range is intermittent and is not likely to occur on a daily basis year round.

A hierarchy of sources was developed for selection of the HBSLs to quantitatively evaluate as many of the identified substances as possible. The hierarchy of sources used was as follows:

- Clean Air Act, EPA National Ambient Air Quality Standards (NAAQS) (Reference 11)
- > EPA Region 9 Preliminary Remediation Goals (PRGs) (Reference 10)
- > EPA Region 3 Risk-Based Concentrations (RBCs) (Reference 9)

Some substances have neither PRGs nor RBCs because they have their own set of regulatory standards. Under the Clean Air Act, the EPA is required to establish NAAQS for several substances considered harmful to public health and the

environment. Currently, NAAQS are available for seven substances. The NAAQS for the longer averaging time were used for the chronic assessment. Depending on the substance, this can range from an 8-hour average to an annual average. In addition, since the majority of the measured TSP was PM_{10} (particulate matter under 10 microns in size) (Reference 3), the NAAQS for PM_{10} was used to evaluate the potential for health effects from exposure to TSP.

Next on the hierarchy, after the NAAQS, are the EPA Region 9 PRGs and the EPA Region 3 RBCs. The methodology used by EPA Region 9 to develop the PRGs generally results in lower values than the EPA Region 3 RBCs. However, there were occasions when the RBCs were lower than the PRGs. To maintain a conservative approach for this study, the lower of the two values from these sources was selected as the HBSL for each substance evaluated. If only one value was available from these sources then it was selected as the HBSL. To ensure that the most recent information was used, the Internet sites of both EPA Regions were checked. The HBSLs used for this assessment are presented in Appendix C.

Although the general approach used by both EPA Region 3 and Region 9 is the same, the exposure assumptions differ enough so that final recommended values can vary to a certain degree. In both methods, a substance's screening concentration was selected using the toxicity endpoint that derives a lower concentration. For example, if a substance has a known systemic toxicity and is a carcinogen, the screening concentration was calculated using both toxicity values. To maintain a conservative approach, EPA then selected the lower screening concentration as the recommended PRG or RBC.

Example 5 shows a sample calculation of how a substance's estimated chronic concentration was compared to its HBSL using the TSP concentration at 300 meters.

Example 5 Sample Calculation Comparing a Substance's Estimated Chronic Concentration to Its HBSL:

$$\frac{C_{chronic(TSP)}}{HBSL} = \frac{3.87E + 00}{5.00E + 01}$$
$$= 7.74E-02 < 1$$

In this case, the resulting ratio is less than one, indicating further evaluation is not necessary.

Many petroleum hydrocarbons were detected but do not have specific screening levels. Therefore, the approach recommended by the Total Petroleum Hydrocarbon Criteria Working Group (Reference 12) was adopted to evaluate petroleum hydrocarbon mixtures. Based on the working group's assessment of various hydrocarbons, it was recommended that mixtures be separated according to a

substance's number of carbons and its chemical class (i.e., aliphatic or aromatic¹). Generally, as a substance's carbon number increases, its molecular weight increases, and it is, therefore, not a substance of concern via inhalation. The working group also concluded that aromatic hydrocarbons tend to be more toxic than aliphatic hydrocarbons (Reference 12). Table 6 presents the inhalation toxicity values used to evaluate exposure to petroleum mixtures. To be consistent with the methodology used in this study, the reference concentrations (RfCs) were converted to PRGs using EPA Region 9 exposure assumptions. The resulting PRGs were used as the HBSLs for the petroleum hydrocarbons in this assessment. These values are presented in Appendix D.

TABLE 6: SUMMARY OF RfCs USED FOR PETROLEUM HYDROCARBONS¹

Carbon Range	Aromatic Inhalation RfC (mg/m³)	Aliphatic Inhalation RfC (mg/m³)
$C_5 - C_6$ $C_{>6} - C_8$		18.4
C _{>7} – C ₈	0.4	
$C_{>8} - C_{10}$ $C_{>10} - C_{12}$ $C_{>12} - C_{16}$	0.2	1.0
$C_{>16} - C_{21}$ $C_{>21} - C_{35}$	NA	NA

Reference 12

NA = not applicable for high molecular weight TPHs (Total Petroleum Hydrocarbons) (C_{>16}) because substances in this carbon range are not volatile and therefore, inhalation is not a pathway of concern.

6.3.2 ACUTE ASSESSMENT

An established method for assessing acute health effects is not currently available. In 1995 the EPA recognized the need for acute exposure guidelines for emergency response purposes and created the National Advisory Committee for Acute Exposure Guideline Levels (AEGLs) for Hazardous Substances. Currently, AEGLs are available for only a few substances

To overcome the absence of acute toxicity data for the purposes of human health risk assessment, several state regulatory agencies have suggested that guidelines developed for emergency purposes be used in the interim. Although suggestions have been made to use occupational exposure limits (OELs) by applying additional safety factors (References 14,15), OELs were not used in this study because they introduce even more uncertainty than the use of emergency guidelines. The OELs

¹ Aliphatic hydrocarbons are hydrocarbons in which the carbon atoms are joined by single covalent bonds consisting of two shared electrons (e.g., butane). Aromatic hydrocarbons have ring structures (e.g., benzene) (Reference 13).

are designed to protect the workplace environment, and assume 8 hours a day, 5 days a week exposures. By definition, these exposures are more chronic than acute.

In comparison, emergency planning guidelines are more appropriate because they are typically developed for exposures of 1-hour or less. In addition, depending on the agency that develops these guidelines, safety factors are included as part of the guideline development, so that the values would be protective of the general population.

Emergency Response Planning Guidelines (ERPGs) published by the American Industrial Hygiene Association (AIHA) (Reference 16) and the Temporary Emergency Exposure Limits (TEELs) developed by the U.S. Department of Energy (DOE) (Reference 17) were used for this study, specifically the ERPG-1s and the TEEL-1s. Since TEEL-1s are intended for exposures up to 15-minutes, air concentrations compared to TEELs were averaged over a 15-minute period. Air concentrations compared to ERPGs and AEGLs were averaged over 1-hour as these values are intended for 1-hour exposures.

For this study, the hierarchy of sources for ATV selection was as follows with each ATV defined below:

- ➤ EPA AEGL-1. "AEGL-1 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic, nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure."
- ➤ AIHA ERPG-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed for up to one hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."
- ➤ DOE TEEL-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."

AEGLs were used first when available since they are developed specifically for the purpose of acute exposure assessments. The ERPGs were selected next, prior to a substance's TEEL, because they are vigorously reviewed before they are published whereas the TEELs are not.

Example 6 shows a sample calculation of how a substance's estimated acute concentration was compared to its ATV using the aluminum concentration at 300 meters.

Example 6 Sample Calculation Comparing a Substance's Estimated Acute Concentration to Its ATV:

$$\frac{C_{acute(Al)}}{ATV} = \frac{4.83E - 01}{3.00E + 04}$$
$$= 1.61E-05 < 1$$

In this example with AI, the ratio is less than one, indicating that further evaluation is not necessary.

7. RISK CHARACTERIZATION

As previously described, the exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic HBSLs or ATVs. The comparison was made using the ratio of the HBSL or ATV to the estimated concentration. This approach is conservative because the exposure assumptions used by the EPA, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near firing ranges.

If this ratio was less than one, no further evaluation was needed. If the chronic or acute averaged concentrations (C_{chronic} and C_{acute}) were greater than the screening levels, resulting in a ratio greater than one, further evaluation would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather, the potential for such.

The chronic and acute assessments were conducted as outlined in Section 6.3. Appendix D presents results from the Tungsten M855 risk characterization.

7.1 CHRONIC HEALTH RISK

The exposure assessment, at the 100-meter downwind hypothetical resident location, indicated that levels of hydrogen cyanide and lead from the Tungsten M855 emissions were greater than their screening levels. Estimated concentrations were remodeled to a distance 200 meters downwind from the firing location. The results showed that modeled concentration of hydrogen cyanide still exceeded its HBSL. However, the estimated lead concentration decreased to a level below its HBSL. When the modeled distance was further increased to 300 meters, the estimated concentration of hydrogen cyanide indicated a safe level. The ratios of all other substances to their HBSLs were below one.

At the 100-meter location, the ratio of estimated hydrogen cyanide concentrations to the HBSL was 3.00. Hydrogen cyanide is a colorless gas with a faint,

bitter, almond-like odor. It is naturally produced by some microorganisms and can be found in a number of foods and plants. Example uses of hydrogen cyanide in industry include chemical production, photographic development, and some mining processes. There are no reports that hydrogen cyanide causes cancer. Long-term inhalation of hydrogen cyanide may result in breathing difficulties, heart pains, vomiting, blood changes, headaches, and enlargement of the thyroid gland (Reference 18).

The ratio of estimated lead concentrations to the HBSL was 1.94 at the 100-meter location. Lead is a naturally occurring bluish-gray metal found in the earth's crust in small amounts. It is commonly used in the production of lead-acid batteries for automotive and industrial applications. Exposure to lead in the air primarily results from emissions from industrial processes. The main target for lead toxicity is the nervous system. Studies have shown that continual inhalation of lead may cause blood effects (Reference 19).

Again, it should be noted that an estimated concentration that is higher than the HBSL does not indicate an onset of health effects, but rather that further evaluation using site-specific data is necessary.

7.2 ACUTE HEALTH RISK

The outcome of the acute assessment indicated that no acute health effects are expected from breathing the air emissions from the Tungsten M855 at the 100-meter location. Since all ratios at the 100-meter location were below one, no further evaluation was needed. However, air concentrations were modeled at the 200- and 300-meter locations for consistency with the chronic assessment. The results of the acute assessment for the 200- and 300-meter locations were even lower than for the 100-meter location.

7.3 FACT SHEET

Appendix E includes a copy of the fact sheet submitted to the AEC. The fact sheet used results from this study to address health concerns related to inhalation of Tungsten M855 air emissions.

8. UNCERTAINTY DISCUSSION

The limitations inherent in modeling and the added conservatism of the assessment contribute to the uncertainty of the study results. The risk assessment methodology typically includes safety factors that are embedded in the toxicity data to ensure adequate protection of the general population, particularly, susceptible individuals such as the sick, elderly, and children. Table 7 identifies areas of uncertainty associated with this assessment.

TABLE 7: TYPES OF UNCERTAINTY

issue	Uncertainty	Direction of Effect		
	Emissions Modeling	1		
Modeled versus real- time sampling	The air concentrations in this study were modeled. Actual air concentrations taken from the field may be higher or lower.	Varies		
Frequency of use for the Tungsten M855	Actual frequency of use for these munitions during training exercises may be different from those stated in this report.	Varies		
Hypothetical resident assumed to be located directly downwind	Unless the area around the training facility is populated, the chances that a person living directly downwind is low.	Overestimates		
Use of worst-case meteorological conditions	To ensure that this study is applicable to most training areas, worst-case meteorological conditions were used in the air model.	Overestimates		
Exposure Assessment				
Comparing estimated concentrations to established screening levels	The EPA Region 3 and Region 9 HBSLs were developed assuming that the resident is exposed 350 days per year. It is unlikely for training with the Tungsten M855 to occur for 350 days per year at a particular firing range.	Overestimates		

TABLE 7: TYPES OF UNCERTAINTY

Issue	Uncertainty	Direction of Effect		
Estimating time- averaged concentrations	Actual exposure from the Tungsten M855 is intermittent. If one were to plot a person's exposure profile, the plot would consist of a series of spikes. Since current risk assessment methodology does not allow the evaluation of the potential for health effects as a function of time, a single concentration, averaged over the exposure duration was used. In this study, the exposure durations used were 30 years and 1-hour or 15 minutes.	Varies		
Comparing estimated concentrations to established screening levels	Comparison to screening levels does not account for possible cumulative effects of exposure to more than one substance.	Underestimates		
Screening assessment versus calculating an average daily intake	Calculating an average daily intake allows the use of scenario-specific assumptions. However, unless the ratio of concentration to screening level approaches one, a screening assessment is useful as a first-cut evaluation.	Varies		
Exposure to other munitions	Other munitions are typically used during the same training exercise. These items may contain similar or different substances from those detected in the Tungsten M855 emissions.	Underestimates		
Toxicity Assessment				
Lack of toxicity data	Some substances were not quantitatively evaluated because they have no known toxicity data.	Underestimates		
Modifying and uncertainty factors for toxicity data	Modifying factors and uncertainty factors of varying degree are typically applied to toxicological values. These factors are used to conservatively account for extrapolating from animal studies for human health evaluation, and to conservatively account for variation in human populations.	Overestimates		

9. CONCLUSION

Using conservative model assumptions, the assessment indicated that residents who live as close as 300 meters directly downwind from the firing location are safe from breathing air emissions from the Tungsten M855. It is believed that the assumptions contained in this assessment are conservative enough to be protective of all the population including the sick, elderly, and children.

10. RECOMMENDATIONS

At installations where offsite residents are located less than 300-meters from the Tungsten M855 firing location, a more site-specific evaluation is recommended. However, it should be noted that at most training installations, training areas are over 1,000 meters (over half a mile) away from populated areas.

The results from this study are intended for a hypothetical training facility, and actual results may vary depending on site-specific conditions. This study used conservative assumptions (e.g., worst-case meteorological conditions, receptor located directly downwind, etc.) and it is believed that most site-specific analyses would result in even lower concentrations. Therefore, the results from this assessment should be applicable to most training facilities unless site-specific conditions vary significantly.

11. POINT OF CONTACT

Questions about this report may be directed to Ms. Joleen Mobley at (800) 222-9698 (ext 2953) or (410) 436-2953.

PREPARED BY:

APPROVED BY:

JOLEEN MOBLEY

Environmental Scientist

Environmental Health Risk Assessment

Program

DAVID 🗹 DAUGHDR

Program Manager

Environmental Health Risk Assessment

STAFFORD D.F.R. COAKLEY

Environmental Engineer

Environmental Health Risk Assessment

Program

APPENDIX A
REFERENCES

- 1. U.S. Army (1994). Technical Manual, Army Ammunition Data Sheets for Small Caliber Ammunition. TM-43-0001-27.
- 2. FAS Military Analysis Network (2000). *M16A2 5.56mm Semiautomatic Rifle*. Available online at www.fas.org/man/dod-101/sys/land/m16.htm.
- 3. U.S. Army. Email communication between Mr. Bill Bolt, ATC, and Ms. Joleen Mobley, USACHPPM. Subject: Electronic copy of Firing Point Emission Study Series 4 Emission Factors, 10 April 2001.
- 4. USACHPPM (Aug. 2000). Ambient Air Quality Consultation NO. 43-EL-1485-00 Air Dispersion Modeling Evaluation For Military Munitions, Aberdeen Proving Ground, MD.
- 5. Bowman Environmental, Inc. (1999). *INPUFF2, Multiple Source Integrated Puff Model*, Version 4.1.
- 6. Title 40, Code of Federal Regulations, Part 68 (40 CFR 68), Chemical Accident Prevention Provisions, 1 July 1998.
- 7. U.S. Army. Email communication between Ms. Tamera Clark-Rush, AEC, and Ms. Hsieng-Ye Chang, USACHPPM. Subject: Scenarios (Small Caliber Ammunition), 12 September 2000.
- 8. Army Training Evaluation Protocol (ARTEP) 7-20-MTP, *Mission Training Plan for the Infantry Battalion*.
- 9. EPA (Oct. 2000). Region 3 Risk Based Concentration (RBC) Tables. Available online at www.epa.gov/reghwmd/risk/riskmenu.htm
- 10.EPA (Nov. 2000). Region 9 Preliminary Remediation Goals (PRG). Available online at www.epa.gov/region09/waste/sfund/prg/index.html
- 11. EPA. *National Ambient Air Quality Standards*. Available online at http://www.epa.gov/ airprogm/airs/criteria.html
- 12. Total Petroleum Hydrocarbon Criteria Working Group (1997). Development of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH), Volume 4. Amherst Scientific Publishers. Amherst, MA.
- 13. Manahan, Stanley (1994). *Environmental Chemistry*. Sixth edition. CRC Press, Inc. Boca Raton, FL.
- 14.U.S. Army (1996). Final Screening Risk Assessment for the Anniston Chemical Agent Disposal Facility at the Anniston Army Depot, Alabama. Revision No. 5. Prepared

- by the U.S. Army Center for Health Promotion and Preventive Medicine for the Program Manager for Chemical Demilitarization. Aberdeen Proving Ground, Maryland.
- 15. U.S. Army (1997). Final Screening Risk Assessment for the Pine Bluff Chemical Agent Disposal Facility at the Pine Bluff Arsenal, Arkansas. Revision No. 1. Prepared by the U.S. Army Center for Health Promotion and Preventive Medicine for the Program Manager for Chemical Demilitarization. Aberdeen Proving Ground, Maryland.
- 16. American Industrial Hygiene Association (AIHA) (1999). *Emergency Response Planning Guidelines*. AIHA Press, Fairfax, VA.
- 17. Department of Energy (1998). *Temporary Emergency Exposure Limits*, Revision 15. http://www.scapa.bnl.gov.
- 18. Agency for Toxic Substances and Disease Registry (1995). *Toxicological Profile for Cyanide.*
- 19. Agency for Toxic Substances and Disease Registry (1999). *Toxicological Profile for Lead.*

APPENDIX B AIR DISPERSION MODELING OUTPUT DATA

	The second secon	Cartridge, 5.5	e, 5,56-mm Ball, M855 No-Lead	No-Lead		No. of rounds (I)		1 round
	Number of items:	s: Trial #1B=>	15	Trial #2B =>	<u>15</u>	release duration (t):	2	2 seconds
		Net Explosive We	e Weight - N.E.W. per item (lbs.) =>	' item (lbs.) =>	3.86E-03	Unit Concentration (UC):	2:030E-04	2,030E-04 g/m³/(g/s)
		ATC Firing Test	Test Results ¹					
	Trial #1B	Trial #2B	Daily	Average	Average	Total:Mass	Substance	Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emitted	(grams/m³)	Rate
Compound	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb://tem)(EF)	(Ib./Ib. NEW)	4 .	CONC	ER.
Permanent Gases		A Company of the Comp						
Ammania (NH ₃)	2.66E+01	2.38E+01	ΑN	2.48E-05	6.42E-03	1.123E-02	1.140E-06	5.615E-03
Carbon Dioxide (CO ₂)	9.79E+02	9.90E+02	NA	9.67E-04	2.51E-01	4.388E-01	4.454E-05	2.194E-01
Carbon Monoxide (CO)	1.85E+03	1.84E+03	NA	1.81E-03	4.69E-01	8.208E-01	8.331E-05	4.104E-01
Oxides of Nitrogen (NO _x)	1.05E+01	1.19E+01	NA	1.10E-05	2.85E-03	4.988E-03	5.063E-07	2.494E-03
Sulfur Dioxide (SO ₂)	5.24E-01	5.24E-01	NA	QN	QN	QN	ΩN	QN
Acid Gases	The state of the s							
Hydrogen Fluoride	2.20E-01	2.20E-01	2.20E-01	QN	QN	QN	ON	QN
Hydrogen Chloride	2.20E-01	2.20E-01	2.10E-01	QN	ND	QN	S	QN
Hydrogen Bromide	2.10E-01	2.10E-01	2.10E-01	ND	ND	GN	S	Q
Nitric Acid	2.20E-01	2.20E-01	2.10E-01	ND	ND	QN	ΩN	QN
Phosphoric Acid	2.20E-01	2.20E-01	2.10E-01	ND	ND	QN	QN	Q
Sulfuric Acid	2.20E-01	2.20E-01	2.10E-01	ND	ND	QN	QN	Q
Cyanide					*			
Particulate Cyanide	1.30E-02	1.30E-02	1.30E-02	1.49E-08	3.85E-06	6.741E-06	6.842E-10	3.370E-06
Hydrogen Cyanide	1.88E+01	2.03E+01	2.70E-02	2.23E-05	5.79E-03	1.013E-02	1.028E-06	5.064E-03
Particulate								
Total Suspended Particulate	3.86E+01	3.85E+01	NA	4.41E-05	1.14E-02	1.999E-02	2.029E-06	9.996E-03
Particulate Matter <10 microns	3.86E+01	3.76E+01	NA	4.35E-05	1.13E-02	1.975E-02	2.005E-06	9.876E-03
Particulate Matter <2.5 microns	2.90E+01	2.82E+01	NA	3.27E-05	8.46E-03	1.481E-02	1.504E-06	7.407E-03
<u>Metals</u>								
Aluminum	2.670E-01	3.053E-01	1.027E-01	2.26E-07	5.86E-05	1.026E-04	1.042E-08	5.131E-05
Antimony	1.380E+00	1.447E+00	1.141E-02	1.62E-06	4.19E-04	7.330E-04	7.440E-08	3.665E-04
Arsenic	1.131E-02	1.174E-02	1.141E-02	QN	QN	QN	S	Q
Barium	4.843E-01	4.932E-01	1.141E-02	5.59E-07	1.45E-04	2.534E-04	2.572E-08	1.267E-04
Beryllium	1.131E-02	1.174E-02	1.141E-02	Q.	ND	QN	ND	QN
Cadmium	1.131E-02	1.174E-02	1.141E-02	QN	Q	ND	QN	QN

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

	Tri21 #40	Triol #0D	7870			4		•
	Measured	Measured	Moseuroa	Average	Average	lotal Mass	Substance	Substance
	Nicasuleu	ואומסחומח	ivicasuled	Hajustea	Adjusted	or Substance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emitted	(grams/m³)	Rate
Compound	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)(EF)	(Ib./Ib. NEW)	W	CONC	ER.
Calcium	5.476E-01	5.589E-01	3.424E-02	5.99E-07	1.55E-04	2.716E-04	2.757E-08	1.358E-04
Chromium	1.131E-02	1.174E-02	1.141E-02	QN	Q	QN	QN	QN
Cobalt	1.131E-02	1.174E-02	1.141E-02	ND	QN	ON	QN	QN
Copper	1.358E+01	1.437E+01	1.141E-02	1.60E-05	4.14E-03	7.247E-03	7.356E-07	3.623E-03
Lead	6.359E+00	5.754E+00	1.141E-02	6.92E-06	1.79E-03	3.140E-03	3.187E-07	1.570E-03
Magnesium	8.373E-02	7.750E-02	1.141E-02	9.22E-08	2.39E-05	4.180E-05	4.243E-09	2.090E-05
Manganese	1.131E-02	1.174E-02	1.141E-02	QN	Q	QN	QN	QN
Nickel	1.131E-02	1.174E-02	1.141E-02	ON	2	ON	QN	QN ON
Selenium	1.131E-02	1.174E-02	1.141E-02	1.34E-08	3.48E-06	6.100E-06	6.191E-10	3.050E-06
Silver	1.131E-02	1.174E-02	1.141E-02	ND	QN	QN	Q	QN
Thallium	1.131E-02	1.174E-02	1.141E-02	ND	ND	ON	QN	QN
Vanadium	1.131E-02	1.174E-02	1.141E-02	ND	QN	QN	QN.	QN
Zinc	1.892E+00	1.935E+00	1.141E-02	2.19E-06	5.67E-04	9.922E-04	1.007E-07	4.961E-04
TO-11 Carbonyls	44							
Formaldehyde	3.70E-01	3.70E-01	2.00E-01	4.23E-07	1.10E-04	1.919E-04	1.947E-08	9.593E-05
Acetaldehyde	3.90E-01	3.50E-01	1.60E-01	2.66E-07	6.89E-05	1.205E-04	1.223E-08	6.026E-05
Acetone	3.10E+00	3.10E+00	3.24E+00	3.60E-07	9.34E-05	1.635E-04	1.659E-08	8.173E-05
Acrolein	2.00E-01	2.00E-01	2.00E-01	ND	ND	ON	QN	QN
Proprionaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	ON .	QN	QV	QN
Crotonaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QV	QN
Butyraldehyde	2.00E-01	2.00E-01	2.00E-01	ND	Ω	QN	QN	Q
Benzaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	ΩN	QN	QN	ΩN
Isovaleraldehyde	2.00E-01	2.00E-01	2.00E-01	QN	Q	ON	QN	QN
Valeraldehyde	2.00E-01	2.00E-01	2.00E-01	ΩΩ	Q	ON	QN	Q
o,m,p-Tolualdehyde	6.00E-01	6.00E-01	6.00E-01	ΩN	QN	QN	QN	QN
Hexaldehyde	2.00E-01	2.00E-01	2.00E-01	Q Q	ΩN	ON	QN	2
2,5-Dimethylbenzaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	ON	Q	Q
TO-14 VOCs (extended list)	4.5			, , , , , , , , , , , , , , , , , , , ,				
Propene	6.54E-02	6.54E-02	1.72E-03	6.90E-08	1.79E-05	3.128E-05	3.175E-09	1.564E-05
Dichlorodiflouromethane	4.45E-03	3.46E-03	3.96E-03	3.83E-10	9.92E-08	1.736E-07	1.762E-11	8.679E-08
Chlorodifluoromethane	3.54E-03	3.54E-03	3.54E-03	ΩN	Q	QN	QN	QN
Freon 114	6.99E-03	6.99E-03	6.99E-03	ND	ND	QN	QN	QN

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

Compound)	l nal #2B	Daily	Average	Average	Total Mass	Substance	Substance
Compound	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emíssion
Compound	Actual	Actual	Background	Emission	Emission	Emitted	(grams/m³)	Rate
	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)(EF)	(ib./lb. NEW)		CONC	ER,
Chloromethane	1.24E-03	1.45E-03	1.45E-03	3.08E-11	7.98E-09	1.397E-08	1.418E-12	6.985E-09
Vinyl Chloride	2.56E-03	2.56E-03	2.56E-03	QN	QN	ND	ΩN	ND
1,3-Butadiene	1.11E-02	1.11E-02	2.21E-03	1.20E-08	3.10E-06	5.421E-06	5.502E-10	2.710E-06
Bromomethane	3.88E-03	3.88E-03	3.88E-03	ΩN	QN	QN	DN	ΩN
Chloroethane	2.64E-03	2.64E-03	2.64E-03	QN	QN	QN	ON	QN
Dichlorofluoromethane	4.21E-03	4.21E-03	4.21E-03	QN	QN	ND	QN	QN
Trichldroflouromethane	1.69E-03	1.69E-03	1.69E-03	1.65E-10	4.27E-08	7.480E-08	7.593E-12	3.740E-08
Pentane	2.36E-03	2.36E-03	2.95E-03	QN	QN	QN	QN	QN
Acrolein	5.27E-02	2.29E-02	2.29E-03	4.07E-08	1.06E-05	1.848E-05	1.876E-09	9.240E-06
1,1-Dichlorethene	4.05E-03	4.05E-03	4.05E-03	QN	QN	QN	QN	ND
Freon 113	7.68E-03	7.68E-03	7.68E-03	QN	ND	ON	DN	ND
Acetone	1.90E-02	1.66E-02	2.14E-02	ND	DN	ND	ON	ND
Methyl lodide	5.81E-03	5.81E-03	5.81E-03	ND	ND	ON	QN	ND
Carbon Disulfide	3.11E-03	3.11E-03	3.11E-03	QN	QN	QN	QN	ND
Acetonitrile	1.36E-01	1.34E-01	1.68E-03	1.46E-07	3.78E-05	6.623E-05	6.722E-09	3.311E-05
3-Chloropropene	3.13E-03	3.13E-03	3.13E-03	QN	Q.	QN	Q	QN
Methylene Chloride	3.23E-01	2.33E-01	2.43E-01	6.09E-08	1.58E-05	2.763E-05	2.805E-09	1.382E-05
tert-Butyl Alcohol	3.03E-03	3.03E-03	3.03E-03	ND	QN	QN	QN	ΩN
Acrylonitrile	4.34E-02	4.56E-02	2.17E-03	4.81E-08	1.25E-05	2.181E-05	2.213E-09	1.090E-05
trans-1,2-Dichloroethene	3.96E-03	3.96E-03	3.96E-03	ND	ND	ON	ON	ND
Methyl t-Butyl Ether	2.16E-03	2.16E-03	3.24E-03	ON	QN	QN	Q.	QN
Hexane	2.11E-03	1.76E-03	2.82E-03	ND	ON	QN	QN	QN
1,1-Dichloroethane	3.97E-03	3.97E-03	3.97E-03	Q	Q	Q	2	Ω
Vinyl Acetate	3.52E-03	3.52E-03	3.52E-03	ND	QN	QN	ND	ND
cis-1,2-Dichloroethene	3.96E-03	3.96E-03	3.96E-03	Q	Q	QN	Q	NΩ
2-Butanone	2.95E-03	2.95E-03	2.06E-03	1.16E-09	3.00E-07	5.252E-07	5.331E-11	2.626E-07
Ethyl Acetate	1.80E-02	2.52E-02	3.60E-03	2.34E-08	6.06E-06	1.061E-05	1.077E-09	5.305E-06
Methyl Acrylate	3.52E-03	3.52E-03	3.52E-03	ON	QN	ON	ON	ΩN
Chloroform	4.88E-03	4.88E-03	4.88E-03	ND	QN	ON	ON	ND
1,1,1-Trichloroethane	5.46E-03	5.46E-03	5.46E-03	S	9	Q	Q	Ω
Carbon Tetrachloride	6.29E-03	6.29E-03	6.29E-03	Q	9	Q	Q	Q
1,2-Dichlorethane	8.09E-03	8.09E-03	4.05E-03	8.75E-09	2.27E-06	3.967E-06	4.026E-10	1.983E-06

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

	Trial #1B	Trial #2B	Daily	Avarage	Average	Total Mass		
	Measured	Measured	Measured	Adjusted	Adilisted	of Substance	Concentration	Substance
	Actual	Actual	Background	Emission	Emission	Emitted	(arams/m³)	Rafe
Compound	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(a/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)(EF)	(Ib:/Ib: NEW)		CONC	ER,
Benzene	5.11E-01	5.43E-01	1.28E-03	5.68E-07	1.47E-04	2.578E-04	2.617E-08	1.289E-04
Isooctane	4.67E-03	4.67E-03	9.34E-04	QN	QN	ON	QN	QN
Heptane	8.20E-04	4.10E-03	8.20E-04	7.29E-11	1.89E-08	3.306E-08	3.356E-12	1.653E-08
Trichloroethane	4.88E-03	4.88E-03	4.88E-03	Q	Q	ND	QN	CN
Ethyl Acrylate	4.09E-03	4.09E-03	4.09E-03	Q	QN	ND	QN	C.
1,2-Dichloropropane	4.62E-03	4.62E-03	4.62E-03	Q	QN	ND	QN	QN
Methyl Methacrylate	4.09E-03	4.09E-03	4.09E-03	QN	Q	QN	QN	QN
Dibromomethane	7.11E-03	7.11E-03	7.11E-03	QN	QN	QN	QN	QN
1,4-Dioxane	3.60E-03	3.60E-03	3.60E-03	QN	ND	QN	QN	QN
Bromodichloromethane	6.70E-03	6.70E-03	6.70E-03	ON	QN	QN	QN	Q
cis-1,3-Dichloropropene	4.54E-03	4.54E-03	4.54E-03	ND	QN	QN	QN	QN
4-Methyl-2-Pentanone	4.10E-03	4.10E-03	4.10E-03	ND	ON	QN	QN	Q
Toluene	2.64E-02	2.64E-02	2.64E-03	2.59E-08	6.71E-06	1.175E-05	1.193E-09	5.877E-06
Octane	4.67E-03	4.67E-03	4.67E-03	QN	Ω	QN	QN	QN
trans-1,3-Dichloropropene	4.54E-03	4.54E-03	4.54E-03	QN	QN	QN	QN	QN.
Ethyl Methacrylate	4.67E-03	4.67E-03	4.67E-03	ON	QN	QN	QN	Q
1,1,2-Trichloroethane	5.46E-03	5.46E-03	5.46E-03	ND	ND	QN	QN	Q
Tertrachloroethene	6.78E-03	6.78E-03	6.78E-03	QN	QN	QN	QN	QN
2-Hexanone	4.10E-03	4.10E-03	4.10E-03	ND	QN	QN	QN	QN
Dibromochloromethane	8.52E-03	8.52E-03	8.52E-03	QN	ON	QN	QN	QN
1,2-Uibromoethane	7.68E-03	7.68E-03	7.68E-03	Q	QN	QN	QN	QN
Chlorobenzene	4.60E-03	4.60E-03	4.60E-03	Q	2	QN	QN	QN
1,1,1,2-1 etrachloroethane	6.87E-03	6.87E-03	6.87E-03	2	ΩN	ND	QN	QN
Emylbenzene	4.34E-03	3.47E-03	4.34E-03	QN	Q	QN	QN	Q
m/p-Xylene	1.30E-02	1.30E-02	2.17E-02	Q	QN	ND	QN	QN
o-Xylene	1.30E-02	1.30E-02	2.17E-02	Q	ND	QN	QN	QN
Styrene	8.52E-03	8.52E-03	4.26E-03	9.21E-09	2.39E-06	4.175E-06	4.238E-10	2.088E-06
Bromoform	1.03E-02	1.03E-02	1.03E-02	QN	ND	QN	QN	QN
Cumene	4.92E-03	4.92E-03	4.92E-03	QN	DN	QN	QN	2
1,1,2,2-1 etrachlorethane	6.87E-03	6.87E-03	6.87E-03	Q	QN	QN	Q	QN
1,2,3-l richloropropane	6.03E-03	6.03E-03	6.03E-03	Ω	ΩN	QN	QN	ND
Bromobenzene	6.42E-03	6.42E-03	6.42E-03	QN	QN	QN	QN	QN

1

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass	Substance	Substance
ar	Measured	Measured	Measured	Adinsfed	Adinsfed	of Slibstance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emilled	(arams/m³)	E E E
Compound	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)(EF)	(Ib./Ib. NEW)		CONC	m K
4-Ethyltoluene	2.46E-03	2.46E-03	2.95E-03	QN	QN	QN	QN	QN
1,3,5-Trimethylbenzene	1.97E-03	1.97E-03	2.46E-03	2	QN	QN	QN	ND
Alpha Methyl Styrene	4.83E-03	4.83E-03	4.83E-03	QN	Q	QN	QN	ND
1,2,4-Trimethylbenzene	4.92E-03	4.92E-03	9.83E-03	QN	QN	ND	Q	ΩN
1,3-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	QN	ND	QN	2	QN
1,4-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	ND	ND	QV	2	QN
Benzyl Chloride	5.18E-03	5.18E-03	5.18E-03	ND	ND	QN	QV	QN
1,2-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	ND	QN	QN	Q	Q
Hexachlorethane	9.68E-03	9.68E-03	9.68E-03	ON	ND	ON	QV	2
1,2,4-Trichlorobenzene	7.42E-03	7.42E-03	7.42E-03	QN	ND	ON	QN	9
Hexachlorobutadiene	1.07E-02	1.07E-02	1.07E-02	ND	ND	QN	QN	Q
<u>Hydrocarbons</u>								
Methane	9.84E+00	9.18E+00	9.84E-01	9.91E-06	2.57E-03	4.494E-03	4.561E-07	2.247E-03
Ethylene	4.93E-01	4.85E-01	2.87E-02	5.59E-07	1.45E-04	2.537E-04	2.575E-08	1.269E-04
Acetylene	6.39E-02	. 6.60E-02	2.56E-02	7.43E-08	1.92E-05	3.369E-05	3.419E-09	1.684E-05
Ethane	2.48E-01	2.50E-01	2.95E-02	2.85E-07	7.38E-05	1.291E-04	1.311E-08	6.457E-05
Propylene	8.26E-02	8.78E-02	4.13E-02	9.74E-08	2.52E-05	4.418E-05	4.484E-09	2.209E-05
Propane	4.33E-02	4.33E-02	4.33E-02	ND	ON	QN	QN	QN
Propyne	3.84E-02	3.84E-02	3.84E-02	ND	QN	ΩN	Q	Q
Isobutane	5.47E-02	5.47E-02	5.47E-02	QN	ON	QN	QN	QN
1-Butene/Isobutylene	1.08E-01	1.08E-01	1.08E-01	QN	QN	QN	QN	QN
1,3-Butadiene/butane	1.65E-01	1.65E-01	1.65E-01	Q	Q	QN	QN	QN
cis-butene	5.51E-02	5.51E-02	5.51E-02	QN	2	QN	ND	ΩN
1-Butyne/trans-butene	1.06E-01	1.06E-01	1.06E-01	ΩN	Q	QN	QN	ΩN
2-Butyne	5.31E-02	5.31E-02	5.31E-02	QN	Q	QN	ND	Ω
n-Pentane	7.08E-02	7.08E-02	7.08E-02	Q	ND	ND	ON	Q
n-Hexane	7.75E-02	7.75E-02	7.75E-02	ΩN	ND	DN	QN	ΩN
SVOCs (8270 List)								
N-nitrosodimethylamine	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	QN
Bis(2-chloroethyl)ether	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	ΩN
Phenol	1.78E-02	1.78E-02	1.81E-02	QN	Q	ON	QN	QN
2-chlorophenol	1.78E-02	1.78E-02	1.81E-02	Q.	QN	QN	QN	ND

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

Compound Measured Actual Actual Actual Concentration Actual Actual Actual Actual (mg/m³) 1,3-dichlorobenzene 1,78E-02 1,78E-02 1,2-dichlorobenzene 1,78E-02 1,78E-02 1,2-dichlorobenzene 1,78E-02 1,78E-02 Benzyl alcohol 1,78E-02 1,78E-02 Bis(2-chlorobenzene 1,78E-02 1,78E-02 Bis(2-chlorobenzene 1,78E-02 1,78E-02 N-nitroso-di-n-propylamine 1,78E-02 1,78E-02 N-nitroso-di-n-propylamine 1,78E-02 1,78E-02 N-nitroso-di-n-propylamine 1,78E-02 1,78E-02 Sophorone 1,78E-02 1,78E-02 Isophorone 1,78E-02 1,78E-02 Sisc(2-chlorophonol 1,78E-02 1,78E-02 Bis(2-chlorophonol 1,78E-02 1,78E-02 L'4-dichlorobenzene 1,78E-02 1,78E-02 L'2,4-trichlorobenzene 1,78E-02 1,78E-02 Hexachlorobutadiene 1,78E-02 1,78E-02 Hexachlorobutadiene 1,78E-02 1,78E-02 Hexachlorobutadiene	ured Measured Jal Background tration Concentration Concentration Concentration 1.81E-02 1.81E	d Adjusted nd Emission lion Factor (Ib./item)(EF) 2 ND 2 ND	Adjusted Emission Eactor	of Substance Emitted	Concentration (grams/m³)	Emission Rate
pound Actual pound Concentration zene 1.78E-02 zene 1.78E-02 zene 1.78E-02 zene 1.78E-02 ropyl)ether 1.78E-02 nre 1.78E-02 ropylamine 1.78E-02 ropylamine 1.78E-02 rosylmethane 1.78E-02 rool 1.78E-02			Emission Factor	Emilled	(grams/m³)	Rate
pound Concentration gene (mg/m³) zene 1.78E-02 zene 1.78E-02 zene 1.78E-02 propyl)ether 1.78E-02 ropylamine 1.78E-02 ropylamine 1.78E-02 roy)methane 1.78E-02 rod 1.78E-02			Factor	The second secon		1
(mg/m³) (zene 1.78E-02 1.		<i>-</i>		(grams/item)		(g/item)/sec
zene 1.78E-02 zene 1.78E-02 zene 1.78E-02 zene 1.78E-02 1.78E-02 zene 1.78E-02 zene 1.78E-02 zene 1.78E-02 zene 1.78E-02 zenol 1.78E-02			(Ib./Ib. NEW)		CONC	ER,
rzene 1.78E-02 rzene 1.78E-02 rzene 1.78E-02 ropyl)ether 1.78E-02 ropylamine 1.78E-02 rodylmethane 1.78E-02 ruol 1.78E-02 ruol 1.78E-02 ruol 1.78E-02 ruol 1.78E-02 ruol 1.78E-02 ruol 1.78E-02			QN	QN	Q	QN
arcene 1.78E-02 1.78E			Q.	QN	S	QN
1.78E-02 are are 1.78E-02 are 1.78E-02 ariol 1.78E-02 1.78E-02 1.78E-02 ariol 1.78E-02 1.78E-02 1.78E-02 ariol 1.78E-02			QN	ON	S	QV
ane 1.78E-02			Q	ND	Q	QN
ane 1.78E-02 propylamine 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 anol 1.78E-02 adiene 1.78E-02 adiene 1.78E-02 adiene 1.78E-02 adiene 1.78E-02			QN	ON	Q	QN
are 1.78E-02 Iropylamine 1.78E-02 I.78E-02 I.78E-02 I.78E-02 I.78E-02 I.78E-02 I.78E-02 I.78E-02 II.78E-02 II.78E-02 II.78E-02 II.78E-02 III.78E-02			QN	QN	Q	QV
oropylamine 1.78E-02			QN	QN	QN	ND
1.78E-02 1.78E-02 1.78E-02 1.78E-02 anol 1.78E-02 anol 1.78E-02 anol 1.78E-02 1.78E-02 anol 1.78E-02			QN	QN	QV	QN
1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02			QN	ND	QN	QN
1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02			QN	ON	Q	QN
1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02	_		QN	ON	QN	ND
1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02			QN	ON	QV	QN
1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02 1.78E-02			QN	ΩN	Q.	ND
1.78E-02 1.78E-02 1.12E-02 1.78E-02 1.78E-02	-		ΩN	ΩN	QN	QN
1.78E-02 1.12E-02 1.78E-02 1.78E-02			2	ON	QN	Q
1.12E-02 1.78E-02 1.78E-02 1.78E-02	E-02 1.81E-02		QN	QN	QN	QN
1.78E-02 1.78E-02 1.78E-02	_	1.3	3.39E-06	5.929E-06	6.018E-10	2.965E-06
1.78E-02	E-02 1.81E-02		QN	QN	Q	QN
1.78E-02	\dashv		QN	QN	QN	QN
	_		QN	ON	QV	QN
1.78E-02		Z ND	ΩN	ON	QN	QN
tadiene 1.78E-02			QN	QN	QN	Q
1.78E-02			Q	ND	QN	QN
1.78E-02		-	ΩN	ON	QN	QN
thalene 1.78E-02	E-02 1.81E-02		Q	ND	ΩN	QN
1.78E-02	-	-	Q	ND	QN	ΩN
1.78E-02		_	QN	ND	ΩN	QN.
1.78E-02	-		ND	ON	S	QN.
1.78E-02		-	ΩN	ON	QN	Q
le 1.78E-02			Q	ND	QN	ΩN
3.55E-02	-02 3.62E-02		Q	ND	QN	ΩN
2,4-dinitrophenol 3.55E-02 3.56E-02			QN	QN	QN	ND

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

	7.11.11	00% H			The second section of the second			•
	Measured	ina #zb Measired	Masilrad	Average ∆diretad	Average Adinstad	lotal Mass	Substance	Substance
	Actual	Actual	Background	Fmission	Emission		Collegialianoli	
Compound	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb /item)(EF)	(Ib,/Ib, NEW)		CONC	ER.
Dibenzofuran	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	ND
2,4-dinitrotoluene	1.78E-02	1.78E-02	1.81E-02	QN	Q	Q	Q	QN
4-nitrophenol	3.55E-02	3.56E-02	3.62E-02	QN	QN	QN	QN	QN
Fluorene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	QN
4-chlorophenyl-phenylether	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	QN
Diethylphthalate	1.78E-02	1.78E-02	1.81E-02	QN	QN	Q	QN	QN
4-nitroaniline	3.55E-02	3.56E-02	3.62E-02	QN	ΩN	QN	QN	Q
4,6-dinitro-2-methylphenol	3.55E-02	3.56E-02	3.62E-02	QN	QN	QN	QN	QN
N-nitrosodiphenylamine(1)	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	QN
4-bromophenyl-phenylether	1.78E-02	1.78E-02	1.81E-02	ΩN	ND	QN	QN	QN
Hexachlorobenzene	1.78E-02	1.78E-02	1.81E-02	ND	QN	QN	QN	QN
Pentachlorophenol	3.55E-02	3.56E-02	3.62E-02	ON	QN	QN	QN	QN
Phenanthrene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	S	Q
Anthracene	1.78E-02	1.78E-02	1.81E-02	ΟN	QN	QN	QN	Q
Di-n-butylphthalate	1.78E-02	, 1.10E-02	1.81E-02	2.58E-07	6.67E-05	1.168E-04	1.186E-08	5.840E-05
Fluoranthene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	QN
Pyrene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	QN
Butylbenzylphthalate	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	QN.
Benzo(a)anthracene	1.78E-02	1.78E-02	1.81E-02	Q	QN	ON	QN	QN
Chrysene	1.78E-02	1.78E-02	1.81E-02	ND	QN	QN	QN	Q
Bis(2-ethylhexyl)phthalate	6.04E-02	5.51E-02	6.52E-02	8.43E-07	2.18E-04	3.823E-04	3.880E-08	1.912E-04
Di-n-octylphthalate	1.78E-02	1.78E-02	1.81E-02	QN	ON	QN	QN	ND
Benzo(b)fluoranthene	1.78E-02	1.78E-02	1.81E-02	Q	QN	QN	ND	ND
Benzo(k)fluoranthene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	DN	ND
Benzo(a)pyrene	1.78E-02	1.78E-02	1.81E-02	Q N	Ω	QN	ND	N ON
Indeno(1,2,3-cd)pyrene	1.78E-02	1.78E-02	1.81E-02	Q	Ω	QN	QN	Ω
Dibenz(a,h)anthracene	1.78E-02	1.78E-02	1.81E-02	ND	QN	QN	Q	S
Benzo(g,h,i)perylene	1.78E-02	1.78E-02	1.81E-02	ND	QN	QN	QN	QN
<u>TO-13 PAHs</u>								
Naphthalene	9.07E-03	1.05E-02	2.72E-04	1.03E-08	2.67E-06	4.674E-06	4.745E-10	2.337E-06
Acenaphthylene	4.27E-04	5.34E-04	1.81E-05	5.19E-10	1.35E-07	2.355E-07	2.390E-11	1.177E-07
Acenaphthene	8.00E-05	8.72E-05	2.17E-05	6.90E-11	1.79E-08	3.129E-08	3.176E-12	1.564E-08

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

	Trial #1B	Trial #2B	Viso	Airerano	Δερέστου	T CASH NASA		•
	Measured	Measured	Measured	Adinsted	Adiireted	of Cinetanoo	Contration	Substance
	Actual	Actual	Background	Emission	Emission	Emilled	(orams/m³)	Eiffission Date
Compound	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(a/item)/sec
Book the second of the second	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)(EF)	(ib./ib.:NEW)		CONC	ER,
Fluorene	2.49E-04	2.85E-04	3.08E-05	2.58E-10	6.69E-08	1.171E-07	1.188E-11	5.853E-08
Phenanthrene	3.02E-04	3.91E-04	9.23E-05	2.84E-10	7.37E-08	1.290E-07	1.309E-11	6.448E-08
Anthracene	4.44E-05	5.51E-05	1.81E-05	5.38E-11	1.40E-08	2.442E-08	2.479E-12	1.221E-08
Fluoranthene	2.84E-04	3.74E-04	3.26E-05	3.24E-10	8.39E-08	1.469E-07	1.491E-11	7.343E-08
Pyrene	7.29E-04	9.61E-04	3.08E-05	8.83E-10	2.29E-07	4.007E-07	4.067E-11	2.003E-07
Benzo(a)anthracene	1.37E-04	1.78E-04	1.81E-05	1.70E-10	4.41E-08	7.720E-08	7.836E-12	3.860E-08
Chrysėne	1.55E-04	2.13E-04	1.81E-05	1.99E-10	5.16E-08	9.031E-08	9.166E-12	4.515E-08
Benzo(b)fluoranthene	1.78E-04	2.49E-04	1.81E-05	2.31E-10	5.98E-08	1.047E-07	1.063E-11	5.236E-08
Benzo(k)fluoranthene	9.24E-05	1.41E-04	1.81E-05	1.26E-10	3.27E-08	5.718E-08	5.803E-12	2.859E-08
Benzo(e)pyrene	2.13E-04	2.85E-04	1.81E-05	2.69E-10	6.98E-08	1.221E-07	1.240E-11	6.107E-08
Benzo(a)pyrene	1.78E-04	2.49E-04	1.81E-05	2.31E-10	5.98E-08	1.047E-07	1.063E-11	5.236E-08
Indeno(1,2,3-cd)pyrene	1.53E-04	2.13E-04	1.81E-05	1.98E-10	5.14E-08	8.988E-08	9.123E-12	4.494E-08
Dibenz(a,h)anthracene	1.78E-05	2.49E-05	1.81E-05	2.71E-11	7.03E-09	1.230E-08	1.249E-12	6.152E-09
Benzo(g,h,i)perylene	6.04E-04	9.61E-04	1.81E-05	8.47E-10	2.19E-07	3.842E-07	3.899E-11	1.921E-07
Dioxins and Furans					· · · · · · · · · · · · · · · · · · ·			
2378-TCDD	3.70E-10	3.80E-10	3.51E-10	4.35E-16	1.13E-13	1.974E-13	2.003E-17	9.869E-14
12378-PECDD	6.89E-10	5.94E-10	7.22E-10	QN	Q	ΩN	QV	QN.
123478-HXCDD	3.28E-10	2.72E-10	3.31E-10	QN	Q	QN	QN	QN
123678-HXCDD	3.46E-10	2.90E-10	3.39E-10	QN	Q	QN	QN	QN
123789-HXCDD	3.17E-10	2.64E-10	3.15E-10	QN	QN	QN	Q	QN
1234678-HPCDD	3.13E-09	3.64E-09	1.98E-09	1.92E-15	4.99E-13	8.730E-13	8.861E-17	4.365E-13
OCDU	2.31E-08	2.59E-08	1.48E-08	1.35E-14	3.50E-12	6.121E-12	6.213E-16	3.061E-12
23/8-1 CDF	0.7.15-10	5.28E-10	8.60E-10	QN !	Q	QN	QN	ND
123/0-FECOT	0.10E-10	3.60E-10	6.63E-10	QN.	Q	QN	ND	ND
234/8-FECUF	4.55E-10	4.20E-10	5.01E-10	Q	Q	ND	ON	ND
1234/8-HXCUF	5.20E-10	5.50E-10	5.40E-10	8.10E-17	2.10E-14	3.676E-14	3.731E-18	1.838E-14
1236/8-HXCDF	4.44E-10	3.97E-10	4.38E-10	Q	Q	ND	ΩN	Ω
123789-HXCDF	2.22E-10	1.85E-10	2.11E-10	QN	ND	QN	Q	QN
234678-HXCDF	3.10E-10	2.61E-10	3.10E-10	Q	QN	QN	QN	QN
1234678-HPCDF	9.10E-10	1.14E-09	7.50E-10	4.35E-16	1.13E-13	1.973E-13	2.003E-17	9.867E-14
1234789-HPCDF	4.62E-10	4.70E-10	4.33E-10	Q	QN	QN	Q	QN
OCDF	2.00E-09	1.09E-09	1.57E-09	2.23E-16	5.77E-14	1.010E-13	1.025E-17	5.050E-14
	r							

MMR_5.56_unleaded

Į

Table B-1: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 100 meter location

								•
	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emitted	(grams/m³)	Rate
Compound	Concentration	Concentration	Concentration	Factor	Factor	(grams/item)		(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)(EF)	(ib./ib. NEW)		၁၈၀၁	界
Energetics								
Nitrobenzene	2.00E+00	2.00E+00	ΝA	QN	QN	QN	QN	QN
2-Nitrotoluene	2.00E+00	2.00E+00	NA	QN	QN	ΩN	Q	QN
3-Nitrotoluene	2.00E+00	2.00E+00	NA	QN	QN	QN	QV	QN
4-Nitrotoluene	2.00E+00	2.00E+00	NA	QN	QN	ΩN	Q	QN
Nitroglycerine	2.00E+00	2.00E+00	NA	QN	QV	ΩN	QN	QN
1,3-Dinitrobenzene	2.00E+00	2.00E+00	AN	QN	Q	QN	S	QN
2,6-Dinitrotoluene	2.00E+00	2.00E+00	ΑN	QN	Q	ΩN	QN	QN
2,4-Dinitrotoluene	2.00E+00	2.00E+00	ΑN	ΩN	2	QN	Q	QN.
1,3,5-Trinitrobenzene	2.00E+00	2.00E+00	NA	ND	QN	QN	QN	9
2,4,6-Trinitrotoluene	2.00E+00	2.00E+00	NA	ΩN	QN	QN	QN	S
RDX	2.00E+00	2.00E+00	NA	ND	QN	QN	QN	QN
4-Amino-2,6-Dinitrotoluene	2.00E+00	2.00E+00	NA	ND	QN	QN	QN	Q.
2-Amino-4,6-Dinitrotoluene	2.00E+00	2.00E+00	NA	ON	QN	ΩN	QN	QN
Tetryl	2.00E+00	. 2.00E+00	NA	ND	QN	QN	QN	S
HMX	4.00E+00	4.00E+00	ΝΑ	ND	ND	ND	ΩN	S
Pentaerythritoltetranitrate	4.00E+00	4.00E+00	NA	ND	QN	QN	Q	S
Dibutyl phthalate	5.00E+01	5.00E+01	NA	ON	QN	QN	Q	S
Dioctyl phthalate	5.00E+01	5.00E+01	NA	ON	QN	NΩ	Q	QN
Diphenylamine	5.00E+01	5.00E+01	NA	ND	ND	QN	QN	Q
Footnotes:								

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emission Study)
NA = Not Applicable
ND = Not Detected

Table B-2: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 200 meter location

		Cartridge, 5.56-mm Ball, M855		No-Lead	では、これのでは、これでは、これでは、これでは、これでは、これでは、これでは、これでは、これ	No. of rounds (I)		1 round
	Number of ite	Number of items: Trial #1B =>	15.00	Trial #2B =>	15	release duration (t):		4 seconds
		Net Explosive Weight - N.E.W. per Item (lbs.) =>	ght N.E.W. per	item (lbs.) =>	3,86E=03	Unit Concentration (UC):	7.778E-0	7.778E-05 a/m³/(a/s)
	****	ATC Firi	ATC Firing Test Results	(s,				
	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass		Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Substance	Emission
Compound	Actual	Actual	Background	Emission	Emission	EMILIED	Concentration	Rate
	Concentration	Concentration	Concentration	Factor (EF)	Factor	(arams/lem)	(drams/m³)	(a/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(lb./lb. NEW)		CONC	ER
Permanent Gases								
Ammonia (NH ₃)	2.66E+01	2.38E+01	¥	2.48E-05	6.42E-03	1.123E-02	2.184E-07	2.808E-03
Carbon Dioxide (CO ₂)	9.79E+02	9.90E+02	Ϋ́	9.67E-04	2.51E-01	4.388E-01	8.533E-06	1.097E-01
Carbon Monoxide (CO)	1.85E+03	1.84E+03	Ϋ́	1.81E-03	4.69E-01	8.208E-01	1.596E-05	2.052E-01
Oxides of Nitrogen (NO _x)	1.05E+01	1.19E+01	NA	1.10E-05	2.85E-03	4.988E-03	9.700E-08	1.247E-03
Sulfur Dioxide (SO ₂)	5.24E-01	5.24E-01	NA	ND	ND	QN	Q	Q
Acid Gases	12 1 5 m 3 1 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		As and a storage way of the work of					
Hydrogen Fluoride	2.20E-01	2.20E-01	2.20E-01	QN	QN	QN	ΩN	Q
Hydrogen Chloride	2.20E-01	2.20E-01	2.10E-01	S	QN	QN	Q	Q
Hydrogen Bromide	2.10E-01	2.10E-01	2.10E-01	ND	QN	QN	QN	QN
Nitric Acid	2.20E-01	2.20E-01	2.10E-01	QN	ΩN	QN	Q	Q
Phosphoric Acid	2.20E-01	2.20E-01	2.10E-01	ON	ON	QN	Q	Q
Sulfuric Acid	2.20E-01	2.20E-01	2.10E-01	ND	ND	QN	QN	Q
Cyanide								
Particulate Cyanide	1.30E-02	1.30E-02	1.30E-02	1.49E-08	3.85E-06	6.741E-06	1.311E-10	1.685E-06
Hydrogen Cyanide	1.88E+01	2.03E+01	2.70E-02	2.23E-05	5.79E-03	1.013E-02	1.969E-07	2.532E-03
Particulate					SARANA TE			1. 数以外的有效
Total Suspended Particulate	3.86E+01	3.85E+01	NA	4.41E-05	1.14E-02	1.999E-02	3.887E-07	4.998E-03
Particulate Matter <10 microns	3.86E+01	3.76E+01	AN	4.35E-05	1.13E-02	1.975E-02	3.841E-07	4.938E-03
Particulate Matter <2.5 microns	2.90E+01	2.82E+01	N A	3.27E-05	8.46E-03	1.481E-02	2.881E-07	3.704E-03
Metals	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -							
Aluminum	2.670E-01	3.053E-01	1.027E-01	2.26E-07	5.86E-05	1.026E-04	1.996E-09	2.566E-05
Antimony	1.380E+00	1.447E+00	1.141E-02	1.62E-06	4.19E-04	7.330E-04	1.425E-08	1.832E-04
Arsenic	1,131E-02	1.174E-02	1.141E-02	ND	ND	QN	Q	Q
Barium	4.843E-01	4.932E-01	1.141E-02	5.59E-07	1.45E-04	2.534E-04	4.928E-09	6.336E-05
Beryllium	1.131E-02	1.174E-02	1.141E-02	QN	ND	QN	QN	Q
Cadmium	1.131E-02	1.174E-02	1.141E-02	ND	ND	QN	QN	Ð
Calcium	5.476E-01	5.589E-01	3.424E-02	5.99E-07	1.55E-04	2.716E-04	5.282E-09	6.791E-05
Chromium	1.131E-02	1.174E-02	1.141E-02	ND	QN	ON	Q	Q
Cobalt	1.131E-02	1.174E-02	1.141E-02	QN	QN	QN	QN	Ð

	Trial #1B	Trial #2B	NieC	Average	Aversive	Total Mass		
	Maserred	Moseurod	Menoritor	Deposition of		Seat Mass		Substance
Compound	Actual	Actual	Background	Finiseion	Adjusted	or Substance	Substance	Emission
	Total and a second	Concess	Cachground	יוייייייייייייייייייייייייייייייייייייי	Enlinesion	Danning	Concentration	Kate
		Concentiation	Concentration 3.	ractor (Er)	ractor	(grams/item)	(grams/m²)	(g/item)/sec
	(шд/ш)	(mg/m)	(mg/m_)	(ID:/IIEm)	(ID./ID. NEW)	JVI.	CONC	EK,
Copper	1.358E+01	1.437E+01	1.141E-02	1.60E-05	4.14E-03	7.247E-03	1.409E-07	1.812E-03
Lead	6.359E+00	5.754E+00	1.141E-02	6.92E-06	1.79E-03	3.140E-03	6.106E-08	7.850E-04
Magnesium	8.373E-02	7.750E-02	1.141E-02	9.22E-08	2.39E-05	4.180E-05	8.128E-10	1.045E-05
Manganese	1.131E-02	1.174E-02	1.141E-02	2	Q	QN	QN	9
Nickel	1.131E-02	1.174E-02	1.141E-02	QN	Q.	QN	Q	QN
Selenium	1.131E-02	1.174E-02	1.141E-02	1.34E-08	3.48E-06	6.100E-06	1.186E-10	1.525E-06
Silver	1.131E-02	1.174E-02	1.141E-02	S	QN	QN	QN	QN
Thallium	1.131E-02	1.174E-02	1.141E-02	Q	QN	QN	QN	ND
Vanadium	1.131E-02	1.174E-02	1.141E-02	S	Q	QN	QN	QN.
Zinc	1.892E+00	1.935E+00	1.141E-02	2.19E-06	5.67E-04	9.922E-04	1.929E-08	2.481E-04
TO-11 Carbonyis		1.44						
Formaldehyde	3.70E-01	3.70E-01	2.00E-01	4.23E-07	1.10E-04	1.919E-04	3.731E-09	4.796E-05
Acetaldehyde	3.90E-01	3.50E-01	1.60E-01	2.66E-07	6.89E-05	1.205E-04	2.344E-09	3.013E-05
Acetone	3.10E+00	3.10E+00	3.24E+00	3.60E-07	9.34E-05	1.635E-04	3.178E-09	4.086E-05
Acrolein	2.00E-01	2.00E-01	2.00E-01	DN	Q	QN	QN	QV
Proprionaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QN	QN
Crotonaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QN	QN
Butyraldehyde	2.00E-01	2.00E-01	2.00E-01	ND	ND	QN	Q	QN
Benzaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	ΩN	QN	QN	QN
Isovaleraldehyde	2.00E-01	2.00E-01	2.00E-01	QN	ND	QN	QN	QN
Valeraldehyde	2.00E-01	2.00E-01	2.00E-01	ΩN	QN	QN	QN	QN
o,m,p-Tolualdehyde	6.00E-01	6.00E-01	6.00E-01	ND	ON	QN	QN	QN
Hexaldehyde	2.00E-01	2.00E-01	2.00E-01	QN	QN	QN	QN	Q
2,5-Dimethylbenzaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	ΩN	QN	QN	S
TO-14 VOCs (extended list)								
Propene	6.54E-02	6.54E-02	1.72E-03	6.90E-08	1.79E-05	3.128E-05	6.083E-10	7.821E-06
Dichlorodiflouromethane	4.45E-03	3.46E-03	3.96E-03	3.83E-10	9.92E-08	1.736E-07	3.375E-12	4.339E-08
Chlorodifluoromethane	3.54E-03	3.54E-03	3.54E-03	QN	QN	QN	QV	QN
Freon 114	6.99E-03	6.99E-03	6.99E-03	QN	QN	QN	QN	ΩN
Chloromethane	1.24E-03	1.45E-03	1.45E-03	3.08E-11	7.98E-09	1.397E-08	2.717E-13	3.493E-09
Vinyl Chloride	2.56E-03	2.56E-03	2.56E-03	ND	QN	QN	Q	QN
1,3-Butadiene	1.11E-02	1.11E-02	2.21E-03	1.20E-08	3.10E-06	5.421E-06	1.054E-10	1.355E-06
Bromomethane	3.88E-03	3.88E-03	3.88E-03	ND	ON	QN	Q	Q
Chloroethane	2.64E-03	2.64E-03	2.64E-03	QN	ON	QN	QN	QN

5/4/2001

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass		Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Substance	Emission
Compound	Actual	Actual	Background	Emission	Emission	Emitted	Concentration	Rate
	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb.//tem)	(Ib./Ib. NEW)		CONC	ĘŖ
Dichlorofluoromethane	4.21E-03	4.21E-03	4.21E-03	ND	QN	QN	QN	QN
Trichloroflouromethane	1.69E-03	1.69E-03	1.69E-03	1.65E-10	4.27E-08	7.480E-08	1.455E-12	1.870E-08
Pentane	2.36E-03	2.36E-03	2.95E-03	ON	QN	ON	QV	QN
Acrolein	5.27E-02	2.29E-02	2.29E-03	4.07E-08	1.06E-05	1.848E-05	3.593E-10	4.620E-06
1,1-Dichlorethene	4.05E-03	4.05E-03	4.05E-03	QN	QN	QN	Q	Q
Freon 113	7.68E-03	7.68E-03	7.68E-03	QN	QN	QN	QV	QN
Acetone	1.90E-02	1.66E-02	2.14E-02	QN	Q	QV	QN	QN
Methyl lodide	5.81E-03	5.81E-03	5.81E-03	ON	QN	QN	QN	QN
Carbon Disulfide	3.11E-03	3.11E-03	3.11E-03	ND	QN	ON	Q	QN
Acetonitrile	1.36E-01	1.34E-01	1.68E-03	1.46E-07	3.78E-05	6.623E-05	1.288E-09	1.656E-05
3-Chloropropene	3.13E-03	3.13E-03	3.13E-03	ND	QN	QN	Q	QV
Methylene Chloride	3.23E-01	2.33E-01	2.43E-01	6.09E-08	1.58E-05	2.763E-05	5.373E-10	6.908E-06
tert-Butyl Alcohol	3.03E-03	3.03E-03	3.03E-03	NΩ	ON	ND	QN	Q
Acrylonitrile	4.34E-02	4.56E-02	2.17E-03	4.81E-08	1.25E-05	2.181E-05	4.240E-10	5.451E-06
trans-1,2-Dichloroethene	3.96E-03	3.96E-03	3.96E-03	S	ON	ON	ON	QN
Methyl t-Butyl Ether	2.16E-03	2.16E-03	3.24E-03	₽	Q	ON	ND	QN
Hexane	2.11E-03	1.76E-03	2.82E-03	Q	Q	ND	ND	QN
1,1-Dichloroethane	3.97E-03	3.97E-03	3.97E-03	Q	9	ON	ND	QN
Vinyl Acetate	3.52E-03	3.52E-03	3.52E-03	Q	QN	QN	DN	QN
cis-1,2-Dichloroethene	3.96E-03	3.96E-03	3.96E-03	Q	Q	ND	ON	QV
2-Butanone	2.95E-03	2.95E-03	2.06E-03	1.16E-09	3.00E-07	5.252E-07	1.021E-11	1.313E-07
Ethyl Acetate	1.80E-02		3.60E-03	2.34E-08	6.06E-06	1.061E-05	2.063E-10	2.653E-06
Methyl Acrylate	3.52E-03	3.52E-03	3.52E-03	Q	Q	QN	ND	QN
Chloroform	4.88E-03	4.88E-03	4.88E-03	QV	2	QV	ND	QN
1,1,1-Trichloroethane	5.46E-03	5.46E-03	5.46E-03	Q	2	ND	ND	QN
Carbon Tetrachloride	6.29E-03	6.29E-03	6.29E-03	Q	Q	QN	ND	QN
1,2-Dichlorethane	8.09E-03	8.09E-03	4.05E-03	8.75E-09	2.27E-06	3.967E-06	7.714E-11	9.917E-07
Benzene	5.11E-01	5.43E-01	1.28E-03	5.68E-07	1.47E-04	2.578E-04	5.014E-09	6.446E-05
Isooctane	4.67E-03	4.67E-03	9.34E-04	QN	QN	QN	ND	Q
Heptane	8.20E-04	4.10E-03	8.20E-04	7.29E-11	1.89E-08	3.306E-08	6.429E-13	8.266E-09
Trichloroethane	4.88E-03	4.88E-03	4.88E-03	Q	Q	ON	QN	QN
Ethyl Acrylate	4.09E-03	4.09E-03	4.09E-03	QN	ND	ON	QN	Ð
1,2-Dichloropropane	4.62E-03	4.62E-03	4.62E-03	ND	QN	QN	QN	2
Methyl Methacrylate	4.09E-03	4.09E-03	4.09E-03	ΩN	Q	QN	ON	2
Dibromomethane	7.11E-03	7.11E-03	7.11E-03	9	Q	QN	QN	ND

Table B-2: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 200 meter location

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass		Substance
Compound	Actual	Actual	Background	Fmission	Emission	or Substance Emitted	Substance	Emission Rate
	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(a/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)		CONC	ER ₁
1,4-Dioxane	3.60E-03	3.60E-03	3.60E-03	ON	QN	QN	QN	QN
Bromodichloromethane	6.70E-03	6.70E-03	6.70E-03	Q.	QV	QN	QN	QV
cis-1,3-Díchloropropene	4.54E-03	4.54E-03	4.54E-03	ND	QN	QN	QN	Q
4-Methyl-2-Pentanone	4.10E-03	4.10E-03	4.10E-03	QN	Q	QN	QN	QV
Toluene	2.64E-02	2.64E-02	2.64E-03	2.59E-08	6.71E-06	1.175E-05	2.285E-10	2.938E-06
Octane	4.67E-03	4.67E-03	4.67E-03	Q	QN	QN	QN	2
trans-1,3-Dichloropropene	4.54E-03	4.54E-03	4.54E-03	QN	Q.	QN	QN	Q
Ethyl Methacrylate	4.67E-03	4.67E-03	4.67E-03	Q	Q	QN	QN	Q
1,1,2-Trichloroethane	5,46E-03	5.46E-03	5.46E-03	ΩN	Q	QN	QN	Q
Tertrachloroethene	6.78E-03	6.78E-03	6.78E-03	QN	Q	QN	QN	Q
2-Hexanone	4.10E-03	4.10E-03	4.10E-03	ΩN	Ð	QN	QN	Q
Dibromochloromethane	8.52E-03	8.52E-03	8.52E-03	QN	<u>Q</u>	QN	QN	Q
1,2-Dibromoethane	7.68E-03	7.68E-03	7.68E-03	QN	S	QN	QN	Q
Chlorobenzene	4.60E-03	4.60E-03	4.60E-03	QN	QN	QN	QN	S
1,1,1,2-Tetrachloroethane	6.87E-03	6.87E-03	6.87E-03	QN	Q.	ND	QN	QN
Ethylbenzene	4.34E-03	3.47E-03	4.34E-03	QN	QN	ON	QN	QN
m/p-Xylene	1.30E-02	1.30E-02	2.17E-02	QN	QN	QN	Q	QN
o-Xylene	1.30E-02	1.30E-02	2.17E-02	ND	QN	ND	QN	QN
Styrene	8.52E-03	8.52E-03	4.26E-03	9.21E-09	2.39E-06	4.175E-06	8.119E-11	1.044E-06
Bromoform	1.03E-02	1.03E-02	1.03E-02	ΩN	QN	ND	QN	QN
Cumene	4.92E-03	4.92E-03	4.92E-03	QN	ΩN	QN	QN	QN
1,1,2,2-Tetrachlorethane	6.87E-03	6.87E-03	6.87E-03	QN	ΩN	ND	QN	Q
1,2,3-Trichloropropane	6.03E-03	6.03E-03	6.03E-03	ND	QN	ND	Q	Q.
Bromobenzene	6.42E-03	6.42E-03	6.42E-03	Q	QN	ND	QN	QV
4-Ethyltoluene	2.46E-03	2.46E-03	2.95E-03	Q	QN	ND	Q	Q
1,3,5-Trimethylbenzene	1.97E-03	1.97E-03	2.46E-03	Q	ΩN	ND	QN	S
Alpha Methyl Styrene	4.83E-03	4.83E-03	4.83E-03	Q Q	Q	ND	ΩN	Q
1,2,4-Trimethylbenzene	4.92E-03	4.92E-03	9.83E-03	Q	ON	ND	QN	S.
1,3-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	ND	ΩN	QN	QN	Q
1,4-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	Q	QN	ND	QN	S
Benzyl Chloride	5.18E-03	5.18E-03	5.18E-03	Q	ON	QN	QN	Q
1,2-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	ΩN	QN	ΩN	ON	ΩN
Hexachlorethane	9.68E-03	9.68E-03	9.68E-03	Ω	QN	ND	QN	Q
1,2,4-Trichlorobenzene	7.42E-03	7.42E-03	7.42E-03	ON	2	QN	Q	S

Table B-2: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 200 meter location

	Irial #1B	Trial #2B	Daily	Average	Average	Total Mass		Substance
	Measured	Measured	Measured	Adjusted	Ádjústed	of Substance	Substance	Emission
Compound	Actual	Actual	Background	Emission	Emission	Emitted	Concentration	Rate
	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(g/item)/sec
· · · · · · · · · · · · · · · · · · ·	(mg/m³)	(mg/m³)	(mg/m³)	(Ib://tem)	(Ib./Ib, NEW)		CONC	ER
Hexachlorobutadiene	1.07E-02	1.07E-02	1.07E-02	ND	ND	QN	ΩN	ΩN
Hydrocarbons								
Methane	9.84E+00	9.18E+00	9.84E-01	9.91E-06	2.57E-03	4.494E-03	8.738E-08	1.123E-03
Ethylene	4.93E-01	4.85E-01	2.87E-02	5.59E-07	1.45E-04	2.537E-04	4.933E-09	6.343E-05
Acetylene	6.39E-02	6.60E-02	2.56E-02	7.43E-08	1.92E-05	3.369E-05	6.551E-10	8.422E-06
Ethane	2.48E-01	2.50E-01	2.95E-02	2.85E-07	7.38E-05	1.291E-04	2.511E-09	3.228E-05
Propylene	8.26E-02	8.78E-02	4.13E-02	9.74E-08	2.52E-05	4.418E-05	8.590E-10	1.104E-05
Propane	4.33E-02	4.33E-02	4.33E-02	ND	QN	QN	QN	QN
Propyne	3.84E-02	3.84E-02	3.84E-02	ND	ΩN	QN	S	QN
Isobutane	5.47E-02	5.47E-02	5.47E-02	QN	QN	QN	QN	QN
1-Butene/Isobutylene	1.08E-01	1.08E-01	1.08E-01	ND	QN	QN	QN	9
1,3-Butadiene/butane	1.65E-01	1.65E-01	1.65E-01	QN	QN	QN	QN	QN
cis-butene	5.51E-02	5.51E-02	5.51E-02	QN	QΝ	QN	QN	QN
1-Butyne/trans-butene	1.06E-01	1.06E-01	1.06E-01	QN	QN	QN	QN	Q
2-Butyne	5.31E-02	5.31E-02	5.31E-02	ON	QN	QN	QN	S
n-Pentane	7.08E-02	7.08E-02	7.08E-02	ND	ΩN	QN	QN	QN
n-Hexane	7.75E-02	7.75E-02	7.75E-02	ND	ΩN	QN	QN	Q
SVOCs (8270 List)								A CONTRACTOR
N-nitrosodimethylamine	1.78E-02	1.78E-02	1.81E-02	QN	ΩN	QN	S	QN
Bis(2-chloroethyl)ether	1.78E-02	1.78E-02	1.81E-02	ON	QN	QN	QN	QN
Phenol	1.78E-02	1.78E-02	1.81E-02	ND	QN	GN	QN	QN
2-chlorophenol	1.78E-02	1.78E-02	1.81E-02	ND	ΩN	QN	QN	Q
1,3-dichlorobenzene	1.78 E -02	1.78E-02	1.81E-02	ND	ΩN	QN	QN	QN
1,4-dichlorobenzene	1.78E-02	1.78E-02	1.81E-02	Q	QN	ND	QN	Q
1,2-dichlorobenzene	1.78E-02	1.78E-02	1.81E-02	Q	QN	ND	QN	ON
Benzyl alcohol	1.78E-02	1.78E-02	1.81E-02	Q	ΩN	ND	QN	ΩN
Bis(2-chloroisopropyl)ether	1.78E-02	1.78E-02	1.81E-02	Q	ND	ON	QN	Ω
2-methylphenol	1.78E-02	1.78E-02	1.81E-02	QN	ND	ND	ΩN	Q
Hexachloroethane	1.78E-02	1.78E-02	1.81E-02	Q	ND	QN	QN	S
N-nitroso-di-n-propylamine	1.78E-02	1.78E-02	1.81E-02	Q	QN	QN	QN	Q
4-methylphenol	1.78E-02	1.78E-02	1.81E-02	Q.	QN	ND	QN	QN
Nitrobenzene	1.78E-02	1.78E-02	1.81E-02	ΩN	QN	QN	QN	Q
Isophorone	1.78E-02	1.78E-02	1.81E-02	QN	ND	QN	QN	S
2-nitrophenol	1.78E-02	1.78E-02	1.81E-02	Ð	QN	GΝ	ON	ND

Table B-2: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 200 meter location

¥

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mase		O. Post
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Substance	Emission
Compound	Actual	Actual	Background	Emission	Emission	Emitted	Concentration	Rafe
	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(a/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)		CONC	ER
2,4-dimethylphenol	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	QN
Bis(2-chloroethoxy)methane	1.78E-02	1.78E-02	1.81E-02	O _N	QN	QN	QX	S
2,4-dichlorophenol	1.78E-02	1.78E-02	1.81E-02	S	Q	QN	QN	Q
1,2,4-trichlorobenzene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	S
Naphthalene	1.12E-02	1.30E-02	1.81E-02	1.31E-08	3.39E-06	5.929E-06	1.153E-10	1 482F-06
4-chloroaniline	1.78E-02	1.78E-02	1.81E-02	QN	QV	QN		CN
Hexachlorobutadiene	1.78E-02	1.78E-02	1.81E-02	Q	Q	QN	Q	S
4-chloro-3-methylphenol	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	2
2-methylnaphthalene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	CN
Hexachlorocyclopentadiene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	QN
2,4,6-trichlorophenol	1.78E-02	1.78E-02	1.81E-02	QN	Ω	QN	QN	QN
2,4,5-trichlorophenol	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	QN
2-chloronaphthalene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	QN
2-nitroaniline	1.78 E- 02	1.78E-02	1.81E-02	Q	QN	QN	QN	S
Acenaphthylene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	QV
Dimethylphthalate	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	2	CZ
2,6-dinitrotoluene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	Q
Acenaphthene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QN	QN
3-nitroaniline	3.55E-02	3.56E-02	3.62E-02	QN	Q	QN	QN	QN
2,4-dinitrophenol	3.55E-02	3.56E-02	3.62E-02	QN	ΩN	QN	Q	QN
Dibenzofuran	1.78E-02	1.78E-02	1.81E-02	ΩN	QN .	QN	Q	QN
2,4-dinitrotoluene	1.78 E -02	1.78E-02	1.81E-02	ΩN	QN	QN	Q	QN
4-nitrophenol	3.55E-02	3.56E-02	3.62E-02	Q	QN	QN	S	Q
Figorene	1.78E-02	1.78E-02	1.81E-02	Q	Q	ND	ΩN	S
4-chlorophenyi-phenyiether	1.785-02	1.78E-02	1.81E-02	QN	Q	DN	QN	S
Dietnylphthalate	1./8E-02	1.78E-02	1.81E-02	QN	Q	ND	Q	QN
4-nitroanine	3.55E-02	3.56E-02	3.62E-02	Q	Q	ND	QN	QN
4,6-dinitro-z-metnyiphenoi	3.55E-0Z	3.56E-02	3.62E-02	NO NO	Q	ND	QN	Q
N-nitrosodiphenylamine(1)	1.78E-02	1.78E-02	1.81E-02	ΩN	QN	ΩN	9	QN
4-bromophenyl-phenylether	1.78E-02	1.78E-02	1.81E-02	2	ON	ON	Q	ND
Hexachiorobenzene	1./8E-02	1.78E-02	1.81E-02	Q	ND	NO	QN	Q
Pentachlorophenol	3.55E-02	3.56E-02	3.62E-02	ΩN	ND	QN	QN	Q.
Phenanthrene	1.78E-02	1.78E-02	1.81E-02	ON	ON	ON	QN	QN
Anthracene	1.78E-02	1.78E-02	1.81E-02	ON	ON	QN	QN	QN.
Di-n-butylphthalate	1.78E-02	1.10E-02	1.81E-02	2.58E-07	6.67E-05	1.168E-04	2.271E-09	2.920E-05

Table B-2: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 200 meter location

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass		Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Substance	Emission
Compound	Actual	Actual	Background	Emission	Emission	Emitted	Concentration	Rate
	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(lb./lb.NEW)		CONC	ER,
Fluoranthene	1.78E-02	1.78E-02	1.81E-02	QN	QN	ON	QN	Q
Pyrene	1.78E-02	1.78E-02	1.81E-02	QN	QN	ON	QN	2
Butylbenzylphthalate	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	Ω
Benzo(a)anthracene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	Q
Chrysene	1.78E-02	1.78E-02	1.81E-02	QN	ND	QN	QN	Q
Bis(2-ethylhexyl)phthalate	6.04E-02	5.51E-02	6.52E-02	8.43E-07	2.18E-04	3.823E-04	7.434E-09	9.558E-05
Di-n-octylphthalate	1.78E-02	1.78E-02	1.81E-02	QN	QN	ON	QV	Q
Benzo(b)fluoranthene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	Q	Q
Benzo(k)fluoranthene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN	QV	Q
Benzo(a)pyrene	1.78E-02	1.78E-02	1.81E-02	QN	QN ND	QN	QV	Q
Indeno(1,2,3-cd)pyrene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	Q	Q
Dibenz(a,h)anthracene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	Q
Benzo(g,h,i)perylene	1.78E-02	1.78E-02	1.81E-02	Q	QN	QN	Q	ΩN
TO-13 PAHS								
Naphthalene	9.07E-03	1.05E-02	2.72E-04	1.03E-08	2.67E-06	4.674E-06	9.090E-11	1.169E-06
Acenaphthylene	4.27E-04	5.34E-04	1.81E-05	5.19E-10	1.35E-07	2.355E-07	4.579E-12	5.887E-08
Acenaphthene	8.00E-05	8.72E-05	2.17E-05	6.90E-11	1.79E-08	3.129E-08	6.084E-13	7.822E-09
Fluorene	2.49E-04	2.85E-04	3.08E-05	2.58E-10	6.69E-08	1.171E-07	2.276E-12	2.927E-08
Phenanthrene	3.02E-04	3.91E-04	9.23E-05	2.84E-10	7.37E-08	1.290E-07	2.508E-12	3.224E-08
Anthracene	4.44E-05	5.51E-05	1.81E-05	5.38E-11	1.40E-08	2.442E-08	4.749E-13	6.105E-09
Fluoranthene	2.84E-04	3.74E-04	3.26E-05	3.24E-10	8.39E-08	1.469E-07	2.856E-12	3.672E-08
Pyrene	7.29E-04	9.61E-04	3.08E-05	8.83E-10	2.29E-07	4.007E-07	7.791E-12	1.002E-07
Benzo(a)anthracene	1.37E-04	1.78E-04	1.81E-05	1.70E-10	4.41E-08	7.720E-08	1.501E-12	1.930E-08
Chrysene	1.55E-04	2.13E-04	1.81E-05	1.99E-10	5.16E-08	9.031E-08	1.756E-12	2.258E-08
Benzo(b)fluoranthene	1.78E-04	2.49E-04	1.81E-05	2.31E-10	5.98E-08	1.047E-07	2.036E-12	2.618E-08
Benzo(k)fluoranthene	9.24E-05	1.41E-04	1.81E-05	1.26E-10	3.27E-08	5.718E-08	1.112E-12	1.429E-08
Benzo(e)pyrene	2.13E-04	2.85E-04	1.81E-05	2.69E-10	6.98E-08	1.221E-07	2.375E-12	3.054E-08
Benzo(a)pyrene	1.78E-04	2.49E-04	1.81E-05	2.31E-10	5.98E-08	1.047E-07	2.036E-12	2.618E-08
Indeno(1,2,3-cd)pyrene	1.53E-04	2.13E-04	1.81E-05	1.98E-10	5.14E-08	8.988E-08	1.748E-12	2.247E-08
Dibenz(a,h)anthracene	1.78E-05	2.49E-05	1.81E-05	2.71E-11	7.03E-09	1.230E-08	2.393E-13	3.076E-09
Benzo(g,h,i)peryiene	6.04E-04	9.61E-04	1.81E-05	8.47E-10	2.19E-07	3.842E-07	7.470E-12	9.604E-08
Dioxins and Furans								
2378-TCDD	3.70E-10	3.80E-10	3.51E-10	4.35E-16	1.13E-13	1.974E-13	3.838E-18	4.935E-14
12378-PECDD	6.89E-10	5.94E-10	7.22E-10	ND	ND	QN	QN	QN

Table B-2: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 200 meter location

	Trial #1B	Trial #2B	Daily	Average	O DOZONO	T T		
	Measured	Measured	Measured	Adinstad	Adinetage	lo(al Mass	•	Substance
Compound	Actual	Actual	Background	Emission	Emission	or Substance Emitted	Substance	Emission
	Concentration	Concentration	Concentration	Factor (EF)	Factor	(arams/item)	(rirams/m³)	(alitom)/ooo
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)	N	CONC	(g/item//sec
123478-HXCDD	3.28E-10	2.72E-10	3.31E-10	S	ΩN	QN	CN	CN
123678-HXCDD	3.46E-10	2.90E-10	3.39E-10	QV	QN	QX	CN	
123789-HXCDD	3.17E-10	2.64E-10	3.15E-10	QV	QN	QN	CZ	S S
1234678-HPCDD	3.13E-09	3.64E-09	1.98E-09	1.92E-15	4.99E-13	8.730E-13	1.698F-17	2 183E-13
OCDD	2.31 E- 08	2.59E-08	1.48E-08	1.35E-14	3.50E-12	6.121E-12	1.190F-16	1 530E-12
2378-TCDF	5.71E-10	5.28E-10	8.60E-10	Q	QN	QN	CN	ND TOOK
12378-PECDF	6.10E-10	5.66E-10	6.63E-10	QN	QN	QN	S	2 2
23478-PECDF	4.55E-10	4.20E-10	5.01E-10	QN	QN	QN	S	2 2
123478-HXCDF	5.20E-10	5.50E-10	5.40E-10	8.10E-17	2.10E-14	3.676E-14	7 148F-19	Q 101E 1E
123678-HXCDF	4.44E-10	3.97E-10	4.38E-10	QN	Q	QX	CN	
123789-HXCDF	2.22E-10	1.85E-10	2.11E-10	QN	QV	QX	2 2	2 2
234678-HXCDF	3.10E-10	2.61E-10	3.10E-10	2	Q	CN		2 2
1234678-HPCDF	9.10E-10	1.14E-09	7.50E-10	4.35E-16	1.13E-13	1.973E-13	3 837E-18	A 034E 14
1234789-HPCDF	4.62E-10	4.70E-10	4.33E-10	QN	2	CX	NI CIN	4.3346-14
OCDF	2.00E-09	1.09E-09	1.57E-09	2.23E-16	5.77E-14	1.010E-13	1 964F-18	0 525E-14
Energetics								£:353C-14
Nitrobenzene	2.00E+00	2.00E+00	٩N	QN	CN	CN	2	
2-Nitrotoluene	2.00E+00	2.00E+00	Ϋ́	Q.		2 2	QN S	QN I
3-Nitrotoluene	2.00E+00	2.00E+00	AN	S	2		QN S	2
4-Nitrotoluene	2.00E+00	2.00E+00	₹ Z	CZ	2 2	2 2	2 2	QN I
Nitroglycerine	2.00E+00	2.00E+00	A.N	CN	S	2 2	2 2	Q S
1,3-Dinitrobenzene	2.00E+00	2.00E+00	ĄN	S	Q.	G Q	2 2	2 2
2,6-Dinitrotoluene	2.00E+00	2.00E+00	AN	Q.	Q	CZ	2 2	2 2
2,4-Dinitrotoluene	2.00E+00	2.00E+00	ΑΝ	QN	QN	QN	2 2	2 2
1,3,5-Trinitrobenzene	2.00E+00	2.00E+00	NA	Q	Q.	QN	Q.	2 2
2,4,6-Trinitrotoluene	2.00E+00	2.00E+00	NA	QN	Q	QN	2	S
RDX	2.00E+00	2.00E+00	NA	ON	Q.	QN	Q	C N
4-Amino-2,6-Dinitrotoluene	2.00E+00	2.00E+00	NA	QN	ΩN	QN	QN	Q
Z-Amino-4, 6-Dinitrotoluene	2.00E+00	2.00E+00	ΝΑ	QN	QN	ΩN	Q	S
Tetry	2.00E+00	2.00E+00	NA	QN	QN	QN	QN	2
HIMX	4.00E+00	4.00E+00	NA	ND	QN	QN	QN	QN
Pentaerythritolitetranitrate	4.00E+00	4.00E+00	NA	QN	QN	QN	QV	QN
Dibutyl phthalate	5.00E+01	5.00E+01	NA	Q	QN	QN	QV	QN
Dioctyl phthalate	5.00E+01	5.00E+01	ΥN	QN	QN	ΩN	2	S
							21.	2

Table B-2: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 200 meter location

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass		Substance
·	Measured	Measured	Measured		Adjusted		Substance	Emission
Compound	Actual	Actual	Background	Emission	Emission		Concentration	Rate
	Concentration	Concentration	Soncentration	Factor (EF)	Factor	(grams/ftem)	(arams/m³)	(a/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)		CONC	ER,
Diphenylamine	5.00E+01	5.00E+01	Ϋ́	Q.	QN	QN	CN	CZ
Footnotes:								

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emission Study) NA = Not Applicable ND = Not Detected

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

Compound Compound Commonia (NH ₃) Carbon Dioxide (CO ₂) Carbon Monoxide (CO) Oxides of Nitrogen (NO _x) Sulfur Dioxide (SO ₂) Acid Gases Hydrogen Fluoride Hydrogen Chloride Hydrogen Bromide	Number of Rem	is: _irlal#TB => <u>15</u> Trial#2B => let Explosive Weight - N.E.W. per Item (lbs.) =>		Trial #2B =>	CONTRACTOR OF THE PERSON OF TH	The state of the s	Marie And College College	seconds
O ₂) (CO) (CO)	Ž	t Explosive Wei		0	was a second section of	release duration (t):		CONTRACTOR MANAGEMENT
Ound (CO) (CO) 2)		The second secon	ght - N.E.W. per	ltem (lbs.) =>	3.86E-03	Unit Concentration (UC):	4.236E-05	(s/g)/, w/g
020 (NO _x)		ATC FIN	ATC Firing Test Results1	lts1				
O2) (CO) (NO _x)	Trial #1B	Trial #2B	Daily	Average	Average		0	
02) (CO) (NO _X)	Measured	Measured	Measured	Adinsfad	Adineted		Substance	Substance
Ound O ₂) (CO) (NO _x)	Actual	Actual	Rackground	Tajasion	najnsten Emissise		Concentration	Emission
O ₂) (CO) (NO _x)	Concentration	Topical traffor	Conception			Emilied	4. 18.7.3	Rate
0 ₂) (CO) (NO _x)	o comination	Collegiilation	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m [*])	(g/item)/sec
(NO _x)	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)		CONC	찟
O ₂) (CO) (NO _x)	m property of the contract of					1000年代の東京の東京の東京の東京の東京の東京の東京の東京の東京の東京の東京の東京の東京の		
O ₂) (CO) (NO _x)	2.66E+01	2.38E+01	ΑN	2.48E-05	6.42E-03	1 123E-02	1 1805 07	2 0000
(CO) (NO _x)	9.79E+02	9.90E+02	AN	9.67E-04	2.51E-01	4.388E-01	4 647F-06	1 007E 01
(NO _x)	1.85E+03	1.84E+03	ΑN	1.81E-03	4.69E-01	8.208E-01	8.692F-06	2.052E-01
2) 	1.05E+01	1.19E+01	ΑN	1.10E-05	2.85E-03	4.988E-03	5.283E-08	1 247E-03
	5.24E-01	5.24E-01	Ą	2	QN	QN	CN	
		The state of the state of		Carte Control of the				
	2.20E-01	2.20E-01	2.20E-01	2	QN	CN	CN	4
	2.20E-01	2.20E-01	2.10E-01	Q	2	QZ	2 2	2 2
	2.10E-01	2.10E-01	2.10E-01	2	Q	QN	2	
	2.20E-01	2.20E-01	2.10E-01	Q.	QN	QV	2 2	2 2
Acid	2.20E-01	2.20E-01	2.10E-01	Ð	QN	QV	2 8	2 2
Sulfuric Acid	2.20E-01	2.20E-01	2.10E-01	Q.	QV	QN	2	2 2
Cyanide								2
Particulate Cyanide	1.30E-02	1.30E-02	1.30E-02	1.49E-08	3 85E-06	6 741E-06	7 1200 11	4 000 T
Hydrogen Cyanide	1.88E+01	2.03E+01	2.70E-02	2 23E-05	5, 79E-03	1 013E-02	1 0735 07	1.583E-U5
Particulate							1.01.0L-01	Z.33ZE-U3
ded Particulate	3.86E+01	3 85F+01	ΔN	1 11 5 0 5	1 11 00	4 000 1		A Comment of the Comm
SU	3.86E+01	3.76E+01	¥	4.35F-05	1 13E-02	1.999E-02 1.975E-02	2.1175-07	4.998E-03
Particulate Matter <2.5 microns	2.90E+01	2.82E+01	A.A.	3.27E-05	8 46F-03	1 481E-02	1 569E 07	4.936E-U3
Metals					3		1.009L-01	3.7 U4E-U3
Aluminum	2.670E-01	3.053E-01	1.027E-01	2 26F-07	5 86E-05	1 026E 04	1 0071 00	20 1001 0
Antimony 1	1.380E+00	1.447E+00	1.141E-02	1.62E-06	4 19F-04	7 330E-04	7 762E 00	4.300E-U5
Arsenic 1	1.131E-02	1.174E-02	1.141E-02	CN	S	NO	1.10ZE-US	1.03ZE-04
Barium 4	4.843E-01	4.932E-01	1.141E-02	5.59E-07	1 45F-04	2 534E-04	00 TA89 C	ON C
Beryllium 1	1.131E-02	1.174E-02	1.141E-02	Q	Ę	CN	Z.004E-03	0.330E-U3
Cadmium 1	1.131E-02	1.174E-02	1.141E-02	2	S		2 2	2 2
	5.476E-01	5.589E-01	3.424E-02	5.99E-07	1.55E-04	2.716E-04	2 877E-09	ND 8 701E 05
ium	1.131E-02	1.174E-02	1.141E-02	2	QV	QN		ND ND
Cobalt 1	1.131E-02	1.174E-02	1.141E-02	QN	S	CN	2 2	2 2

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Triol #10	Trini #00	- Coally	A 44 A 44 A 44	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1		
	Measured	Measured	Measured	Adinstad	Average Admistad	of Cultification	Substance	Substance
	Actual	Actual	Background	Fmission	Fmission	D Substation	Concentration	Emission
Compound	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	raie (a/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(lb./lb. NEW)		CONC	ER.
Copper	1.358E+01	1.437E+01	1.141E-02	1.60E-05	4.14E-03	7.247E-03	7.675E-08	1.812E-03
Lead	6.359E+00	5.754E+00	1.141E-02	6.92E-06	1.79E-03	3.140E-03	3.325E-08	7.850E-04
Magnesium	8.373E-02	7.750E-02	1.141E-02	9.22E-08	2.39E-05	4.180E-05	4.426E-10	1.045E-05
Manganese	1.131E-02	1.174E-02	1.141E-02	QN	QV	ΩN	QN	QN
Nickel	1.131E-02	1.174E-02	1.141E-02	Q	QN	QN	QN	QN
Selenium	1.131E-02	1.174E-02	1.141E-02	1.34E-08	3.48E-06	6.100E-06	6.459E-11	1.525E-06
Silver	1.131E-02	1.174E-02	1.141E-02	QN.	QN	QN	QN	QV
Thallium	1.131E-02	1.174E-02	1.141E-02	Q.	QN	QN	Q	Q
Vanadium	1.131E-02	1.174E-02	1.141E-02	QV	QN	QN	QN	QN
Zinc	1.892E+00	1.935E+00	1.141E-02	2.19E-06	5.67E-04	9.922E-04	1.051E-08	2.481E-04
TO-11 Carbonyls			A 100 M		The state of the s			
Formaldehyde	3.70E-01	3.70E-01	2.00E-01	4.23E-07	1.10E-04	1.919E-04	2.032E-09	4.796E-05
Acetaldehyde	3.90E-01	3.50E-01	1.60E-01	2.66E-07	6.89E-05	1.205E-04	1.276E-09	3.013E-05
Acetone	3.10E+00	3.10E+00	3.24E+00	3.60E-07	9.34E-05	1.635E-04	1.731E-09	4.086E-05
Acrolein	2.00E-01	2.00E-01	2.00E-01	ΩN	QN	QN	QN	QN
Proprionaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QN	Q.
Crotonaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QN	ΩN
Butyraldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QN	QN
Benzaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QN	QN
Isovaleraldehyde	2.00E-01	2.00E-01	2.00E-01	QN	QN	QN	QN	QN
Valeraldehyde	2.00E-01	2.00E-01	2.00E-01	ND	QN	QN	QN	QN
o,m,p-Tolualdehyde	6.00E-01	6.00E-01	6.00E-01	ND	ΩN	QN	QN	QN
Hexaldehyde	2.00E-01	2.00E-01	2.00E-01	QN	QN	QN	QN	QN
2,5-Dimethylbenzaldehyde	2.00E-01	2.00E-01	2.00E-01	ND	ND	QN	Q	QN
TO-14 VOCs (extended list)								-
Propene	6.54E-02	6.54E-02	1.72E-03	6.90E-08	1.79E-05	3.128E-05	3.313E-10	7.821E-06
Dichlorodiflouromethane	4.45E-03	3.46E-03	3.96E-03	3.83E-10	9.92E-08	1.736E-07	1.838E-12	4.339E-08
Chlorodifluoromethane	3.54E-03	3.54E-03	3.54E-03	ND	QN	QN	QN	QN
Freon 114	6.99E-03	6.99E-03	6.99E-03	ND	QN	QN	QV	Q
Chloromethane	1.24E-03	1.45E-03	1.45E-03	3.08E-11	7.98E-09	1.397E-08	1.480E-13	3.493E-09
Vinyl Chloride	2.56E-03	2.56E-03	2.56E-03	QN	ND	QN	Q.	ND
1,3-Butadiene	1.11E-02	1.11E-02	2.21E-03	1.20E-08	3.10E-06	5.421E-06	5.740E-11	1.355E-06
Bromomethane	3.88E-03	3.88E-03	3.88E-03	ΩN	ΩN	ND	QV	QN
Chloroethane	2.64E-03	2.64E-03	2.64E-03	Q	Q	QN	QV	Q.
Dichlorofluoromethane	4.21E-03	4.21E-03	4.21E-03	2	ΩN	QN	QN	ΩN

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emitted		Rate
Compound	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m²)	(g/item)/sec
	("m/m)	(ˈmg/m²)	(ˈmg/m²)	(lb./item)	(lb./lb. NEW)		CONC	ER
Trichloroflouromethane	1.69E-03	1.69E-03	1.69E-03	1.65E-10	4.27E-08	7.480E-08	7.922E-13	1.870E-08
Pentane	2.36E-03	2.36E-03	2.95E-03	ND	QN	ON .	Q	Q
Acrolein	5.27E-02	2.29E-02	2.29E-03	4.07E-08	1.06E-05	1.848E-05	1.957E-10	4.620E-06
1,1-Dichlorethene	4.05E-03	4.05E-03	4.05E-03	QN	S	QN	2	QN
Freon 113	7.68E-03	7.68E-03	7.68E-03	Q	Q	QN	Q	Q
Acetone	1.90E-02	1.66E-02	2.14E-02	Q	QV	QN	2	QN
Methyl lodide	5.81E-03	5.81E-03	5.81E-03	QN	QV	ON	Q	Q
Carbon Disulfide	3.11E-03	3.11E-03	3.11E-03	QN	ΩN	ON	Q	Q
Acetonitrile	1.36E-01	1.34E-01	1.68E-03	1.46E-07	3.78E-05	6.623E-05	7.014E-10	1.656E-05
3-Chloropropene	3.13E-03	3.13E-03	3.13E-03	QN	QN	QN	2	Q
Methylene Chloride	3.23E-01	2.33E-01	2.43E-01	6.09E-08	1.58E-05	2.763E-05	2.926E-10	6.908E-06
tert-Butyl Alcohol	3.03E-03	3.03E-03	3.03E-03	ND	ND	QN	2	QN
Acrylonitrile	4.34E-02	4.56E-02	2.17E-03	4.81E-08	1.25E-05	2.181E-05	2.309E-10	5.451E-06
trans-1,2-Dichloroethene	3.96E-03	3.96E-03	3.96E-03	ND	QV	QN	Q	Q
Methyl t-Butyl Ether	2.16E-03	2.16E-03	3.24E-03	QN	QN	QN	Q	QN
Hexane	2.11E-03	1.76E-03	2.82E-03	ND	ON	ON	Q	QN
1,1-Dichloroethane	3.97E-03	3.97E-03	3.97E-03	ND	ND	QN	Q	QN
Vinyl Acetate	3.52E-03	3.52E-03	3.52E-03	ND	ND	QN	2	QN
cis-1,2-Dichloroethene	3.96E-03	3.96E-03	3.96E-03	ND	ND	QN	Q	Q
2-Butanone	2.95E-03	2.95E-03	2.06E-03	1.16E-09	3.00E-07	5.252E-07	5.562E-12	1.313E-07
Ethyl Acetate	1.80E-02	2.52E-02	3.60E-03	2.34E-08	6.06E-06	1.061E-05	1.124E-10	2.653E-06
Methyl Acrylate	3.52E-03	3.52E-03	3.52E-03	ND	QN	QN	Q	Q
Chloroform	4.88E-03	4.88E-03	4.88E-03	Q	QN	QN	QN	QN
1,1,1-Trichloroethane	5.46E-03	5.46E-03	5.46E-03	Q	ND	QN	QN	QN
Carbon Tetrachloride	6.29E-03	6.29E-03	6.29E-03	QN	QN	QN	QN	Q
1,2-Dichlorethane	8.09E-03	8.09E-03	4.05E-03	8.75E-09	2.27E-06	3.967E-06	4.201E-11	9.917E-07
Benzene	5.11E-01	5.43E-01	1.28E-03	5.68E-07	1.47E-04	2.578E-04	2.731E-09	6.446E-05
Isooctane	4.67E-03	4.67E-03	9.34E-04	ND	ND	QN	QN	Q
Heptane	8.20E-04	4.10E-03	8.20E-04	7.29E-11	1.89E-08	3.306E-08	3.501E-13	8.266E-09
Trichloroethane	4.88E-03	4.88E-03	4.88E-03	QN	ND	QN	Q	Q
Ethyl Acrylate	4.09E-03	4.09E-03	4.09E-03	NO	ND	QN	QN	Ω
1,2-Dichloropropane	4.62E-03	4.62E-03	4.62E-03	QN ON	ND	QN	QN	ΩN
Methyl Methacrylate	4.09E-03	4.09E-03	4.09E-03	ND	ND	QN	QN	Q
Dibromomethane	7.11E-03	7.11E-03	7.11E-03	Q	ND	QN	QN	Q
1,4-Dioxane	3.60E-03	3.60E-03	3.60E-03	2	QN	QN	QN	NO

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Trial #18	Trial #2B	Oaily	Average	Average		Total Maga	Contraction	3
	Measured	Measured	Measured	Adiisted	Adirietad	ć	of Guberano	Constance	Substance
	Actual	Actual	Background	Emission	Emission	5	Emitted	Concentration	Emission
Compound	Concentration	Concentration	Concentration	Factor (EF)	Factor	<u>.</u> 6	(grams/item)	(grams/m³)	(a/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(lb./lb: NEW)			CONC	ER.
Bromodichloromethane	6.70E-03	6.70E-03	6.70E-03	QN	QN		Q	S	QX
cis-1,3-Dichloropropene	4.54E-03	4.54E-03	4.54E-03	Q.	QN		QN	QV	Q
4-Methyl-2-Pentanone	4.10E-03	4.10E-03	4.10E-03	Q	QN		ON	QN	QN
Toluene	2.64E-02	2.64E-02	2.64E-03	2.59E-08	6.71E-06	-	1.175E-05	1.245E-10	2.938E-06
Octane	4.67E-03	4.67E-03	4.67E-03	Q	Q		ND	<u>Q</u>	QN
trans-1,3-Dichloropropene	4.54E-03	4.54E-03	4.54E-03	Ω	QN		QN ON	QV	Q
Ethyl Methacrylate	4.67E-03	4.67E-03	4.67E-03	QN	QN		QN	QV	QN
1,1,2-Trichloroethane	5.46E-03	5.46E-03	5.46E-03	Q	QV		QN	QN	NO.
Tertrachloroethene	6.78E-03	6.78E-03	6.78E-03	ND	Q		QN	QN	2
2-Hexanone	4.10E-03	4.10E-03	4.10E-03	ON	ND		QN	QN	QN
Dibromochloromethane	8.52E-03	8.52E-03	8.52E-03	QN	QN		QN	QN	Q
1,2-Dibromoethane	7.68E-03	7.68E-03	7.68E-03	ΩN	QN		Q.	QN	QN
Chlorobenzene	4.60E-03	4.60E-03	4.60E-03	ND	QN		Q	QN	QN ON
1,1,1,2-Tetrachloroethane	6.87E-03	6.87E-03	6.87E-03	ΩN	QN		QN	Q	QN
Ethylbenzene	4.34E-03	3.47E-03	4.34E-03	ND	Ω		QN	QN	Q
m/p-Xylene	1.30E-02	1.30E-02	2.17E-02	QN	QV		QN	QN	Q
o-Xylene	1.30E-02	1.30E-02	2.17E-02	ON	QN		QN	QN	QN
Styrene	8.52E-03	8.52E-03	4.26E-03	9.21E-09	2.39E-06	4	175E-06	4.422E-11	1.044E-06
Bromoform	1.03E-02	1.03E-02	1.03E-02	ΩN	ND		QN	QN	QN
Cumene	4.92E-03	4.92E-03	4.92E-03	ND	ND		Q	QN	QN
1,1,2,2-Tetrachlorethane	6.87E-03	6.87E-03	6.87E-03	QN	ND		NO.	QN	QN
1,2,3-Trichloropropane	6.03E-03	6.03E-03	6.03E-03	QN	ND		ND	QV	ND
Bromobenzene	6.42E-03	6.42E-03	6.42E-03	Q	ΩN		ON	QN	Q
4-Ethyltoluene	2.46E-03	2.46E-03	2.95E-03	Q	ND		QN	QN	Q
1,3,5-Trimethylbenzene	1.97E-03	1.97E-03	2.46E-03	Ω	QN		QN	QN	Q
Alpha Methyl Styrene	4.83E-03	4.83E-03	4.83E-03	Ω	ND		ΩN	QN	Q
1,2,4-Irimethylbenzene	4.92E-03	4.92E-03	9.83E-03	Q	ND		QN	QN	ΩN
1,3-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	Q	QN O		NΩ	QN	QN
1,4-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	Q	ND		QN	Q	QN
Benzyl Chloride	5.18E-03	5.18E-03	5.18E-03	ND	ND		ΩN	Q	QN
1,2-Dichlorobenzene	6.01E-03	6.01E-03	6.01E-03	Q	ND		ON	Q.	QN
Hexachlorethane	9.68E-03	9.68E-03	9.68E-03	QN	ND		QN	QV	QN
1,2,4-Trichlorobenzene	7.42E-03	7.42E-03	7.42E-03	Q	ND		QN	Q	QN
Hexachlorobutadiene	1.07E-02	1.07E-02	1.07E-02	ND	ND		QN	QV	QN
Hydrocarbons									

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Trial #1B	Trist #30	died	Anchor	A CHEST AND A STATE OF		Company Section (
	Measured	Magerrad	Massilfad	Avelage Adirietor	Avelage	Ord Wass	Substance	Substance
	Actual	Actilal	Backdround	Emission	Emission		Concern anon	EITIISSION Date
Compound	Concentration	Concentration	Concentration	Factor (FF)	Factor	(Grame//hem)	(orams/m ³)	(dillem)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb:/ltem)	(Ib./Ib.*NEW)		CONC	ER,
Methane	9.84E+00	9.18E+00	9.84E-01	9.91E-06	2.57E-03	4.494E-03	4.759E-08	1.123E-03
Ethylene	4.93E-01	4.85E-01	2.87E-02	5.59E-07	1.45E-04	2.537E-04	2.687E-09	6.343E-05
Acetylene	6.39E-02	6.60E-02	2.56E-02	7.43E-08	1.92E-05	3.369E-05	3.568E-10	8.422E-06
Ethane	2.48E-01	2.50E-01	2.95E-02	2.85E-07	7.38E-05	1.291E-04	1.368E-09	3.228E-05
Propylene	8.26E-02	8.78E-02	4.13E-02	9.74E-08	2.52E-05	4.418E-05	4.678E-10	1.104E-05
Propane	4.33E-02	4.33E-02	4.33E-02	QN	Q	QN	Q	QN
Propyne	3.84E-02	3.84E-02	3.84E-02	QN	Q.	QN	Q	QV
Isobutane	5.47E-02	5.47E-02	5.47E-02	QN	QN	QN	QN	QN
1-Butene/Isobutylene	1.08E-01	1.08E-01	1.08E-01	ΩN	QN	QN	QN	QN
1,3-Butadiene/butane	1.65E-01	1.65E-01	1.65E-01	QN	QN	QN	Q	QN
cis-butene	5.51E-02	5.51E-02	5.51E-02	QN	Q	QN	QV	Q
1-Butyne/trans-butene	1.06E-01	1.06E-01	1.06E-01	ND	Q	QN	Q	QN
2-Butyne	5.31E-02	5.31E-02	5.31E-02	QN	ΩN	QN	Q	Q
n-Pentane	7.08E-02	7.08E-02	7.08E-02	QN	Q	QN	Ð	QN
n-Hexane	7.75E-02	7.75E-02	7.75E-02	QN	Ð	ΩN	Q	Q
SVOCs (8270 List)			A Selection of the contract of					10 年 10 年 10 日 10 日 10 日 10 日 10 日 10 日
N-nitrosodimethylamine	1.78E-02	1.78E-02	1.81E-02	QN	QV	QN	QN	N
Bis(2-chloroethyl)ether	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	Q	QN
Phenol	1.78E-02	1.78E-02	1.81E-02	ND	ND	ON	QV	QN
2-chlorophenol	1.78E-02	1.78E-02	1.81E-02	ND	ND	QN	QV	QN
1,3-dichlorobenzene	1.78E-02	1.78E-02	1.81E-02	ND	QN	QV	QN	QN
1,4-dichlorobenzene	1.78E-02	1.78E-02	1.81E-02	QN	QN	ON	QV	QN
1,2-dichlorobenzene	1.78E-02	1.78E-02	1.81E-02	QN	QN	ON	QN	S
Benzyl alcohol	1.78E-02	1.78E-02	1.81E-02	Q	Ω	QN	ND	QN
Bis(2-chloroisopropyl)ether	1.78E-02	1.78E-02	1.81E-02	Q	Q	ON	ND	QN
2-methylphenol	1.78E-02	1.78E-02	1.81E-02	ΩN	S	QN	ND	ΩN
Hexachloroethane	1.78E-02	1.78E-02	1.81E-02	Q	N O	ND	QN	ΩN
N-nitroso-di-n-propylamine	1.78E-02	1.78E-02	1.81E-02	Ω	QN	QN	ND	QN
4-methylphenol	1.78E-02	1.78E-02	1.81E-02	Q.	QN	ON	QN	Q
Nitrobenzene	1.78E-02	1.78E-02	1.81E-02	ND	QN	ON	QN	S
Isophorone	1.78E-02	1.78E-02	1.81E-02	Q.	ΩN	ON	QN	2
2-nitrophenol	1.78E-02	1.78E-02	1.81E-02	Q	QN	ND	QN	Q
2,4-dimethylphenol	1.78E-02	1.78E-02	1.81E-02	ND	Q.	QN	QN	Ω
Bis(2-chloroethoxy)methane	1.78E-02	1.78E-02	1.81E-02	Q N	Q	ND	QN	QN
2,4-dichlorophenol	1.78E-02	1.78E-02	1.81E-02	2	QN	QN	QN	ΩN

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Trial #1B	Trial #0B	Visco	Androad	Contractor V			į.
	Measured	Measured	Measured	Adjusted	Average	of Substance	Substance	Substance Emission
	Actual	Actual	Background	Emission	Emissión	Emitted		Rate
Compound	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³).	(lb./item)	(ib./lb. NEW)		CONC	ER.
1,2,4-trichlorobenzene	1.78E-02	1.78E-02	1.81E-02	ΩN	ΩN	QN	QN	QN
Naphthalene	1.12E-02	1.30E-02	1.81E-02	1.31E-08	3.39E-06	5.929E-06	6.279E-11	1.482E-06
4-chloroaniline	1.78E-02	1.78E-02	1.81E-02	ND	QN	QN	QV	Q
Hexachlorobutadiene	1.78E-02	1.78E-02	1.81E-02	ND	QN	QN	Q	Q.
4-chloro-3-methylphenol	1.78E-02	1.78E-02	1.81E-02	ND	Q	QN	Q	QN
2-methylnaphthalene	1.78E-02	1.78E-02	1.81E-02	Q.	Q	QN	Q	S
Hexachlorocyclopentadiene	1.78E-02	1.78E-02	1.81E-02	ON	QN	QN	QN	QN
2,4,6-trichlorophenol	1.78E-02	1.78E-02	1.81E-02	ΩN	QN	QN	QN	QN
2,4,5-trichlorophenol	1.78E-02	1.78E-02	1.81E-02	ON	ND	QN	QN	QN
2-chloronaphthalene	1.78E-02	1.78E-02	1.81E-02	ΩN	ND	QN	QN	QN
2-nitroaniline	1.78E-02	1.78E-02	1.81E-02	ON	QN	QN	QN	QN
Acenaphthylene	1.78E-02	1.78E-02	1.81E-02	QN	ON	QN	Q	QN
Dimethylphthalate	1.78E-02	1.78E-02	1.81E-02	ND	ND	QN	2	QN
2,6-dinitrotoluene	1.78E-02	1.78E-02	1.81E-02	ND	ND	QN	Q	QN
Acenaphthene	1.78E-02	1.78E-02	1.81E-02	ND	ND	QN	QN	QN
3-nitroaniline	3.55E-02	3.56E-02	3.62E-02	QN	ND	QN	QV	QN
2,4-dinitrophenol	3.55E-02	3.56E-02	3.62E-02	ON	ND	QN	Q	Q
Dibenzofuran	1.78E-02	1.78E-02	1.81E-02	ON	ND	QN	Q	QN
2,4-dinitrotoluene	1.78E-02	1.78E-02	1.81 E -02	ON	ND	QN	Q	QN
4-nitrophenol	3.55E-02	3.56E-02	3.62E-02	ND	ND	QN	QN	QN
Fluorene	1.78E-02	1.78E-02	1.81E-02	QN	ON	QN	QN	QN
4-chlorophenyl-phenylether	1.78E-02	1.78E-02	1.81E-02	QN	ND	QN	QV	QN
Diethylphthalate	1.78E-02	1.78E-02	1.81E-02	QN	ND	QN	QV	Q
4-nitroaniline	3.55E-02	3.56E-02	3.62E-02	Ω	ΩN	ON	Q	Q
4,6-dinitro-2-methylphenol	3.55E-02	3.56E-02	3.62E-02	Q	ND	QN	QN	QN
N-nitrosodiphenylamine(1)	1.78E-02	1.78E-02	1.81E-02	QN	ΩN	QN	Q	QN
4-bromophenyi-phenylether	1.78E-02	1.78E-02	1.81E-02	ΩN	ND	ON	QN	QN
Hexachlorobenzene	1.78E-02	1.78E-02	1.81E-02	QN	NΩ	QN	QN	QN
Pentachlorophenol	3.55E-02	3.56E-02	3.62E-02	ND	ND	QN	QN	QN
Phenanthrene	1.78E-02	1.78E-02	1.81E-02	ND	ND	QN	Q	QN
Anthracene	1.78E-02	1.78E-02	1.81E-02	QN	ND	ND	Q	Q.
Di-n-butylphthalate	1.78E-02	1.10E-02	1.81E-02	2.58E-07	6.67E-05	1.168E-04	1.237E-09	2.920E-05
Fluoranthene	1.78E-02	1.78E-02	1.81E-02	Q	ΩN	QN	QV	QN
Pyrene	1.78E-02	1.78E-02	1.81E-02	ΩN	NO	QN	Q	QN
Butylbenzylphthalate	1.78E-02	1.78E-02	1.81E-02	Q.	QN	QN	QN	QN

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Trial #1B	Trial #2B	Daily	Average	Averada	Total Massing Street	Substance	Cothertone
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emitted		Rate
Compound	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(q/item)/sec
e de la companya del companya de la companya de la companya del companya de la companya del la companya de la c	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)		CONC	E. S.
Benzo(a)anthracene	1.78E-02	1.78E-02	1.81E-02	QN	ΩN	QN	QN	QN
Chrysene	1.78E-02	1.78E-02	1.81E-02	Q	QN	QN	QN	QV
Bis(2-ethylhexyl)phthalate	6.04E-02	5.51E-02	6.52E-02	8.43E-07	2.18E-04	3.823E-04	4.049E-09	9.558E-05
Di-n-octylphthalate	1.78E-02	1.78E-02	1.81E-02	ND	ΩN	QN	QN	QN
Benzo(b)fluoranthene	1.78E-02	1.78E-02	1.81E-02	QN	Q	QN .	QN	QN
Benzo(k)fluoranthene	1.78E-02	1.78E-02	1.81E-02	QN	QN	QN	QN	Q
Benzo(a)pyrene	1.78E-02	1.78E-02	1.81E-02	Ω	QN	QN	QN	QN
Indeno(1,2,3-cd)pyrene	1.78E-02	1.78E-02	1.81E-02	Q	ΩN	QN	S	2
Dibenz(a,h)anthracene	1.78E-02	1.78E-02	1.81E-02	Q	QN	QN	Q	QN
Benzo(g,h,i)perylene	1.78E-02	1.78E-02	1.81E-02	QN	Ω	QN	QN	Q
TO-13 PAHS								
Naphthalene	9.07E-03	1.05E-02	2.72E-04	1.03E-08	2.67E-06	4.674E-06	4.950E-11	1.169E-06
Acenaphthylene	4.27E-04	5.34E-04	1.81E-05	5.19E-10	1.35E-07	2.355E-07	2.494E-12	5.887E-08
Acenaphthene	8.00E-05	8.72E-05	2.17E-05	6.90E-11	1.79E-08	3.129E-08	3.313E-13	7.822E-09
Fluorene	2.49E-04	2.85E-04	3.08E-05	2.58E-10	6.69E-08	1.171E-07	1.240E-12	2.927E-08
Phenanthrene	3.02E-04	3.91E-04	9.23E-05	2.84E-10	7.37E-08	1.290E-07	1.366E-12	3.224E-08
Anthracene	4.44E-05	5.51E-05	1.81E-05	5.38E-11	1.40E-08	2.442E-08	2.586E-13	6.105E-09
Fluoranthene	2.84E-04	3.74E-04	3.26E-05	3.24E-10	8.39E-08	1.469E-07	1.555E-12	3.672E-08
Pyrene	7.29E-04	9.61E-04	3.08E-05	8.83E-10	2.29E-07	4.007E-07	4.243E-12	1.002E-07
Benzo(a)anthracene	1.37E-04	1.78E-04	1.81E-05	1.70E-10	4.41E-08	7.720E-08	8.176E-13	1.930E-08
Chrysene	1.55E-04	2.13E-04	1.81E-05	1.99E-10	5:16E-08	9.031E-08	9.564E-13	2.258E-08
Benzo(b)fluoranthene	1.78E-04	2.49E-04	1.81E-05	2.31E-10	5.98E-08	1.047E-07	1.109E-12	2.618E-08
Benzo(k)fluoranthene	9.24E-05	1.41E-04	1.81E-05	1.26E-10	3.27E-08	5.718E-08	6.055E-13	1.429E-08
Benzo(e)pyrene	2.13E-04	2.85E-04	1.81E-05	2.69E-10	6.98E-08	1.221E-07	1.293E-12	3.054E-08
Benzo(a)pyrene	1.78E-04	2.49E-04	1.81E-05	2.31E-10	5.98E-08	1.047E-07	1.109E-12	2.618E-08
Indeno(1,2,3-cd)pyrene	1.53E-04	2.13E-04	1.81E-05	1.98E-10	5.14E-08	8.988E-08	9.518E-13	2.247E-08
Dibenz(a,h)anthracene	1.78E-05	2.49E-05	1.81E-05	2.71E-11	7.03E-09	1.230E-08	1.303E-13	3.076E-09
Benzo(g,h,i)perylene	6.04E-04	9.61E-04	1.81E-05	8.47E-10	2.19E-07	3.842E-07	4.068E-12	9.604E-08
Dioxins and Furans	A Section of the sect	18 19 25 A						
2378-TCDD	3.70E-10	3.80E-10	3.51E-10	4.35E-16	1.13E-13	1.974E-13	2.090E-18	4.935E-14
12378-PECDD	6.89E-10	5.94E-10	7.22E-10	QN	QN	ND	Q	Q
123478-HXCDD	3.28E-10	2.72E-10	3.31E-10	2	QN	QN	Q	Q
123678-HXCDD	3.46E-10	2.90E-10	3.39E-10	Q	Ω	ND	QN	S
123789-HXCDD	3.17E-10	2.64E-10	3.15E-10	2	Q	QN	Q.	Q
1234678-HPCDD	3.13E-09	3.64E-09	1.98E-09	1.92E-15	4.99E-13	8.730E-13	9.245E-18	2.183E-13

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emitted		Rate
Compound	Concentration	Concentration	Concentration	Factor (EF)	Factor	(grams/item)	(grams/m³)	(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)		CONC	ER
осрр	2.31E-08	2.59E-08	1.48E-08	1.35E-14	3.50E-12	6.121E-12	6.483E-17	1.530E-12
2378-TCDF	5.71E-10	5.28E-10	8.60E-10	ND	QN	QN	S	QN
12378-PECDF	6.10E-10	5.66E-10	6.63E-10	QN	Q	QN	QV	ΩN
23478-PECDF	4.55E-10	4.20E-10	5.01E-10	QN	Q	QN	Q.	QN
123478-HXCDF	5.20E-10	5.50E-10	5.40E-10	8.10E-17	2.10E-14	3.676E-14	3.893E-19	9.191E-15
123678-HXCDF	4.44E-10	3.97E-10	4.38E-10	QN	Q	QN	Q	Q
123789-HXCDF	2.22E-10	1.85E-10	2.11E-10	ΩN	QV	QN	QN	QN
234678-HXCDF	3.10E-10	2.61E-10	3.10E-10	ND	Q	QN	QN	QN
1234678-HPCDF	9.10E-10	1.14E-09	7.50E-10	4.35E-16	1.13E-13	1.973E-13	2.090E-18	4.934E-14
1234789-HPCDF	4.62E-10	4.70E-10	4.33E-10	ND	ND	QN	Q	QN
OCDF	2.00E-09	1.09E-09	1.57E-09	2.23E-16	5.77E-14	1.010E-13	1.070E-18	2.525E-14
Energetics		The Contract	3 1 2 2 1					
Nitrobenzene	2.00E+00	2.00E+00	NA	ON	QN	QN	Q	QN
2-Nitrotoluene	2.00E+00	2.00E+00	NA	ND	ND	QN	Q	Q
3-Nitrotoluene	2.00E+00	2.00E+00	NA	QN	ND	QN	Q	QN
4-Nitrotoluene	2.00E+00	2.00E+00	NA	QN	ND	QN	QV	QN.
Nitroglycerine	2.00E+00	2.00E+00	ΝΑ	ON	ND	ΩN	Q	QN
1,3-Dinitrobenzene	2.00E+00	2.00E+00	NA	ND	ND	QN	Q	Q
2,6-Dinitrotoluene	2.00E+00	2.00E+00	NA	ON	ND	QN	QV	QN
2,4-Dinitrotoluene	2.00E+00	2.00E+00	ΑN	QN	ND	QN	QN	QN
1,3,5-Trinitrobenzene	2.00E+00	2.00E+00	ΝΑ	QN	ND	QN	QN	Q
2,4,6-Trinitrotoluene	2.00E+00	2.00E+00	ΑN	QN	ND	QN	QN	S
RDX	2.00E+00	2.00E+00	ΝΑ	QN	ND	QN	QN	QN
4-Amino-2,6-Dinitrotoluene	2.00E+00	2.00E+00	NA	Q.	ΩN	QN	QN	QN
2-Amino-4,6-Dinitrotoluene	2.00E+00	2.00E+00	ΑN	Ω	ND	QN	QN	Q
Tetryl	2.00E+00	2.00E+00	ΝΑ	ND	QN	QN	QN	Q.
HMX	4.00E+00	4.00E+00	ΑN	QN	ND	QN	QN	Q.
Pentaerythritoltetranitrate	4.00E+00	4.00E+00	Ϋ́	QN	QN	QN	Q	Q
Dibutyl phthalate	5.00E+01	5.00E+01	NA	QN	Ð	QN	ND	ΩN
Dioctyl phthalate	5.00E+01	5.00E+01	NA	QN	ND	QN	ΩN	Q
Diphenylamine	5.00E+01	5.00E+01	NA	QN.	ND	QN	QN	Q
Footnotes:								

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emission Study)

NA = Not Applicable

Table B-3: Air Modeling Output Data for the Tungsten Cartridge, 5.56-mm Ball, M855 (M16A2) - 300 meter location

	Trial #1B	Trial #2B	Daily	Average	Average	Total Mass	Substance	Substance
	Measured	Measured	Measured	Adjusted	Adjusted	of Substance	Concentration	Emission
	Actual	Actual	Background	Emission	Emission	Emitted		Rate
Compound	Concentration	Concentration	concentration	Factor (EF)	Factor	(grams/ltem)	(grams/m³)	(g/item)/sec
	(mg/m³)	(mg/m³)	(mg/m³)	(lb./item)	(Ib./Ib. NEW)		CONC	厥
ND = Not Detected								

APPENDIX C

HEALTH-BASED SCREENING LEVELS AND ACUTE TOXICITY VALUES

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

(c or nc) (µg/m³) (µg/m²) (µg/m³) (µg/	Compound	CAS#	Region 9 PRG	Toxicity Endpoint	Region 3 RBC	Toxicity Endpoint	HBSL	ERPG		AEGL	Source	ATV
ricases ricases (NH3) 7664-41-7 1.04E+02 nc 1.04E+02 loxide (CO2) 124-38-9 NA NA NA onoxide (CO2) 124-38-9 1.00E+04 nc 1.04E+02 siouse (SO2) 10102-43-9³ 1.00E+02 nc 3.65E+02 xide (SO2) 7446-09-5³ 8.00E+01 nc NA ess 764-39-3 NA NA NA chloride 764-39-3 NA NA NA chloride 764-39-3 NA NA NA locacid 764-39-3 NA NA NA locacid 764-38-2 1.04E+01 nc 2.08E+01 sid 764-38-3 NA NA NA cid 764-38-3 NA NA NA cid 6 Cyanide 74-90-8 3.13E+00 nc 1.46E+00 fees 6 Cyanide 7440-36-0 5.01E+01 nc 1.46E+00			(µg/m³)	(c or nc)	(_E w/grl)	(c or nc)	(_{m/bn})	(m/grl)	(m/gd)	(mg/m³)	(A,T,orE)	(fug/m³)
ioxide (CO ₂) 124-38-9 NA NA Onoxide (CO ₂) 630-08-0° 1.00E+04 NC NA Onoxide (CO) 630-08-0° 1.00E+04 NC NA Onoxide (CO) 630-08-0° 1.00E+04 NC NA Onoxide (SO ₂) 7446-09-5° 8.00E+01 NC NA Oction	nent Gases											
ioxide (CO ₂) 124-38-9 NA NA NA NA NITrogen (as NO) 10102-43-9° 1.00E+04 nc NA NITrogen (as NO) 10102-43-9° 1.00E+01 nc 3.65E+02 NITrogen (as NO) 10102-43-9° 1.00E+01 nc 3.65E+02 NITrogen (as NO) 10102-43-9° 1.00E+01 nc 3.65E+02 NITrogen (as NO) 10102-43-9° 1.00E+01 nc 3.65E+01 nc 1.0035-10-6 NA	nia (NH ₃)	7-14-4997	1.04E+02	nc	1.04E+02	n Su	1.04E+02	1.75E+04	1.75E+04	¥	ш	1.75E+04
esonoxide (CO) 630-08-0° 1.00E+04 nc NA Nitrogen (ss NO) 10102-43-9° 1.00E+02 nc 3.65E+02 xide (SO ₂) 7446-09-5° 8.00E+01 nc 3.65E+02 side (SO ₂) 7446-09-5° 8.00E+01 nc NA ess 7664-39-3 NA NA NA chloride 7647-01-0 2.08E+01 nc 2.08E+01 bromide 7697-37-2 NA NA NA icacid 7664-38-2 1.04E+01 nc 1.06E+01 cid 7664-38-2 1.04E+01 nc 1.06E+01 cid 7664-38-2 1.04E+01 nc 1.06E+01 cid 7664-38-3 1.04E+01 nc 1.4E+00 copanide 57-12-5 NA NA 1.46E+00 tosaid 7440-90-8 1.50E+01 nc 1.46E+00 tosaid 7440-36-0 1.740E-03 nc 3.65E+00 tosaid 7440-43-3 1	Dioxide (CO ₂)	124-38-9	ΑĀ		¥		¥	ΑĀ	5.40E+07	NA NA	-	5.40E+07
Nitrogen (as NO) 10102-43-9ª 1.00E+02 nc 3.65E+02 and esses and electron of the color of the col	Monoxide (CO)	630-08-0ª	1.00E+04	nc	ΑĀ		1.00E+04	2.30E+05	2.28E+05	AA A	ш	2.30E+05
ess rade (SO ₂) 7446-09-5° 8.00E+01 nc NA ess rade (SO ₂) rade (SO ₂) rade (SO ₂) na NA NA fluoride 764-39-3 NA NA NA NA chloride 764-39-6 NA NA NA NA ic acid 7697-37-2 NA NA NA NA ic acid 7664-38-2 1.04E+01 nc 1.06E+01 NA NA cid 7664-33-9 NA NA NA NA NA NA e Cyanide 57-12-5 NA 1.06E+01 nc 3.14E+00 NA NA NA cyanide 57-12-5 NA 1.50E+01 nc 3.05E+00 NA NA NA pended Particulate 7440-36-0 5.01E+01 nc 3.05E+00 NA 1.46E+00 in 7440-38-0 5.11E-01 nc 4.15E-04 nc 1.45E-04 r <th< td=""><td>of Nitrogen (as NO)</td><td>10102-43-9ª</td><td></td><td>nc</td><td></td><td>nc</td><td>1.00E+02</td><td>NA</td><td>3.08E+04</td><td>NA</td><td>1</td><td>3.08E+04</td></th<>	of Nitrogen (as NO)	10102-43-9ª		nc		nc	1.00E+02	NA	3.08E+04	NA	1	3.08E+04
ess NA NA fluoride 7664-39-3 NA NA chloride 7647-01-0 2.08E+01 nc 2.08E+01 bromide 7697-37-2 NA NA NA ic acid 7664-38-2 1.04E+01 nc 1.06E+01 cid 7664-93-9 NA NA NA e Cyanide 57-12-5 NA 7.30E+01 cod 74-90-8 3.13E+00 nc 3.14E+00 cyanide 5.00E+01 nc NA nc pended Particulate 3 5.00E+01 nc 3.14E+00 cyanide 7440-36-6 NA 1.46E+00 nA pended Particulate 3 5.00E+01 nc 3.14E+00 n 3 1.50E+01 nc 3.14E+00 n 7440-36-6 5.11E+00 nc 7.45E-04 n 7440-38-2 5.21E-01 nc 7.45E-04 n 7440-43-3 1.07E-03 <t< td=""><td>Dioxide (SO₂)</td><td>7446-09-5ª</td><td>8.00E+01</td><td>nc</td><td>AN</td><td></td><td>8.00E+01</td><td>7.89E+02</td><td>7.86E+02</td><td>NA</td><td>ш</td><td>7.89E+02</td></t<>	Dioxide (SO ₂)	7446-09-5ª	8.00E+01	nc	AN		8.00E+01	7.89E+02	7.86E+02	NA	ш	7.89E+02
fluoride 7664-39-3 NA NA chloride 7647-01-0 2.08E+01 nc 2.08E+01 bromide 7697-37-2 NA NA NA ic acid 7664-38-2 1.04E+01 nc 1.06E+01 cid 7664-33-9 NA NA NA e Cyanide 57-12-5 NA 7.30E+01 cod 74-90-8 3.13E+00 nc 3.14E+00 pended Particulate 74-90-8 3.13E+00 nc NA pended Particulate 3 5.00E+01 nc 3.65E+00 n 3 1.50E+01 nc 1.46E+00 n 7440-36-0 5.11E+00 nc 3.65E+00 n 7440-38-0 5.11E-01 nc 3.65E+00 n 7440-38-0 5.21E-01 nc 7.45E-04 n 7440-39-3 5.21E-01 nc 7.45E-04 n 7440-43-9 1.07E-03 nc 9.94E-04 n	iases											
chloride 7647-01-0 2.08E+01 nc 2.08E+01 hromide 10035-10-6 NA	Jen fluoride	7664-39-3	NA		NA		NA	1.60E+03	1.64E+03	1.60E+03	Α	1.60E+03
bromide 10035-10-6 NA NA NA NA IC acid 7697-37-2 NA NA NA IC acid 7664-38-2 1.04E+01 nC 1.06E+01 Cid 7664-93-9 NA NA NA IC Acyanide 57-12-5 NA ST3E+00 nC 3.14E+00 IC Acyanide 12789-66-1 ^a 5.00E+01 nC NA IC Acyanide 12740-36-0 NA IC Acyanide 12740-36-0 NA IC Acyanide 12740-38-2 IC Acyanide 12740-38-2 IC Acyanide IC Acyanide 12740-38-2 IC Acyanide IC	Jen chloride	7647-01-0	2.08E+01	nc	2.08E+01	nc	2.08E+01	4.50E+03	4.47E+03	2.70E+03	A	2.70E+03
ic acid 7664-38-2 1.04E+01 nc 1.06E+01 cid acid 7664-93-9 NA NA NA NA Cyanide 57-12-5 NA 7.30E+01 nc 74-90-8 3.13E+00 nc 3.14E+00 nc 74-90-8 74-90-8 7.00E+01 nc NA	Jen bromide	10035-10-6	NA		NA		NA	ΑN	9.93E+03	NA	_	9.93E+03
ic acid 7664-38-2 1.04E+01 nc 1.06E+01 cid 7664-93-9 NA NA NA e Cyanide 57-12-5 NA 7.30E+01 Cyanide 74-90-8 3.13E+00 nc 3.14E+00 res 12789-66-1 ^a 5.00E+01 nc NA pended Particulate a 5.00E+01 nc NA n a 1.50E+01 nc NA n 7440-36-0 5.11E+00 nc 3.65E+00 n 7440-38-0 4.77E-04 c 4.15E-04 7440-38-2 4.77E-04 c 7.45E-04 7440-41-7 8.00E-04 c 7.45E-04 7440-43-9 1.07E-03 c 9.94E-04 7440-43-9 1.07E-03 c 1.53E-04 n 7440-43-9 1.07E-03 c 1.53E-04 n 7440-43-9 1.07E-03 c 1.53E-04 n 7440-48-4 NA 1.46E+02	cid	7697-37-2	NA		NA		NA	۷V	2.58E+03	1.30E+03	Α	1.30E+03
cid 7664-93-9 NA NA NA e Cyanide 57-12-5 NA 7.30E+01 Cyanide 74-90-8 3.13E+00 nc 3.14E+00 pended Particulate 12789-66-1a 5.00E+01 nc NA pended Particulate a 5.00E+01 nc NA n a 1.50E+01 nc NA n 7429-90-5 5.11E+00 nc 3.65E+00 n 7440-36-0 NA 1.46E+00 n 7440-38-2 4.47E-04 c 4.15E-04 n 7440-38-3 5.21E-01 nc 5.11E-01 n 7440-41-7 8.00E-04 c 7.45E-04 n 7440-43-9 1.07E-03 c 9.94E-04 n 7440-43-9 1.07E-03 c 1.53E-04 n 7440-43-9 1.07E-03 c 1.53E-04 n 7440-43-9 1.07E-03 c 1.53E-04 n 7440-	noric acid	7664-38-2	1.04E+01	nc	1.06E+01	nc	1.04E+01	NA	3.00E+03	NA	⊢	3.00E+03
e Cyanide 57-12-5 NA 7.30E+01 Cyanide 74-90-8 3.13E+00 nc 3.14E+00 fes Pended Particulate 12789-66-1³ 5.00E+01 nc NA Pended Particulate 12789-66-1³ 5.00E+01 nc NA Instructulate 3 6.00E+01 nc NA Instructulate 7440-36-0 NA 1.46E+00 Instructulate 7440-38-0 4.47E-04 c 4.15E-04 Instructulate 7440-38-2 4.47E-04 c 7.45E-04 Instructulate 7440-38-2 7.460-30-3 c 9.94E-04 Instructulate 7440-47-3 nc 7.440-47-3 nc 1.53E-04 Instructulate 7440-48-4 NA 1.46E+02 Instructulate 1.46E+02 </td <td>s Acid</td> <td>7664-93-9</td> <td>AN</td> <td></td> <td>NA</td> <td></td> <td>NA</td> <td>2.00E+03</td> <td>2.00E+03</td> <td>ΝA</td> <td>ш</td> <td>2.00E+03</td>	s Acid	7664-93-9	AN		NA		NA	2.00E+03	2.00E+03	ΝA	ш	2.00E+03
e Cyanide 57-12-5 NA 7.30E+01 Cyanide 74-90-8 3.13E+00 nc 7.30E+01 fes 3.13E+00 nc 3.14E+00 pended Particulate 12789-66-1³ 5.00E+01 nc NA n ³ 5.00E+01 nc NA n 7429-90-5 5.11E+00 nc 3.65E+00 n 7440-36-0 NA 1.46E+00 n 7440-38-2 4.47E-04 c 4.15E-04 n 7440-39-3 5.21E-01 nc 5.11E-01 n 7440-39-3 5.21E-01 nc 7.45E-04 n 7440-41-7 8.00E-04 c 7.45E-04 n 7440-43-9 1.07E-03 c 9.94E-04 n 7440-47-3 nA nA nA n 7440-47-3 nA nA 1.46E+02 n 7440-48-4 nA 1.46E+02	<i>l</i> e											
gen Cyanide 74-90-8 3.13E+00 nc 3.14E+00 ulates Suspended Particulate 12789-66-1a 5.00E+01 nc NA Suspended Particulate a 5.00E+01 nc NA Imm 7429-90-5 5.11E+00 nc 3.65E+00 Indm 7440-36-0 NA 1.46E+00 Indm 7440-38-2 4.47E-04 c 4.15E-04 Indm 7440-41-7 8.00E-04 c 7.45E-04 Indm 7440-41-7 8.00E-03 c 9.94E-04 Indm 7440-47-3 c 9.94E-04 Indm 7440-48-3 c 9.94E-04 Indm 7440-48-4 NA 1.46E+02 Indm 7440-48-4 NA 1.46E+02	llate Cyanide	57-12-5	AN		7.30E+01	nc	7.30E+01	NA	5.00E+03	NA	Τ	5.00E+03
ulates a 5.00E+01 nc NA Suspended Particulate 12789-66-1a 5.00E+01 nc NA s 5.00E+01 nc NA NA s 1.50E+01 nc NA NA s 7429-90-5 5.11E+00 nc 3.65E+00 nn 7440-36-0 NA 1.46E+00 c 7440-38-2 4.47E-04 c 4.15E-04 um 7440-41-7 8.00E-04 c 7.45E-04 um 7440-41-7 8.00E-04 c 7.45E-04 m 7440-47-3 0.77E-03 c 9.94E-04 ium 7440-47-3 NA NA 1.53E-04 ium 7440-48-4 NA 2.19E+02 iium 7440-48-4 NA 2.19E+02 iir 7440-48-4 NA 1.46E+02	Jen Cyanide	74-90-8	3.13E+00	nc	3.14E+00	nc	3.13E+00	NA	5.17E+03	NA	Τ	5.17E+03
Suspended Particulate 12789-66-1³ 5.00E+01 nc NA Image: Substance of the color of the	ulates											
B 5.00E+01 nc NA Inum 7429-90-5 5.11E+00 nc 3.65E+00 Inum 7440-36-0 NA 1.46E+00 Inum 7440-38-2 4.47E-04 c 4.15E-04 Inum 7440-39-3 5.21E-01 nc 5.11E-01 Inum 7440-41-7 8.00E-04 c 7.45E-04 Inum 7440-41-7 8.00E-04 c 7.45E-04 Inum 7440-43-9 1.07E-03 c 9.94E-04 Inimm 7440-43-9 1.07E-03 c 9.94E-04 Inimm 7440-47-3 NA NA Inimm 7440-48-4 NA 2.19E+02 Inimm 7440-48-4 NA 2.19E+02	uspended Particulate	12789-66-1ª	5.00E+01	nc	NA		5.00E+01	NA	NA	NA		NA
E 1.50E+01 nc NA num 7429-90-5 5.11E+00 nc 3.65E+00 ony 7440-36-0 NA 1.46E+00 n c 7440-38-2 4.47E-04 c 4.15E-04 n 7440-39-3 5.21E-01 nc 5.11E-01 um 7440-41-7 8.00E-04 c 7.45E-04 um 7440-41-7 8.00E-04 c 7.45E-04 m 7440-43-9 1.07E-03 c 9.94E-04 ium 7440-70-2 NA nA NA ium 7440-47-3 c 1.53E-04 ium 7440-48-4 NA 2.19E+02 ir 7440-48-4 NA 2.19E+02		В	5.00E+01	nc	NA		5.00E+01	NA	NA	NA		NA
1 7429-90-5 5.11E+00 nc 3.65E+00 7440-36-0 NA 1.46E+00 7440-38-2 4.47E-04 c 4.15E-04 7440-39-3 5.21E-01 nc 5.11E-01 7440-41-7 8.00E-04 c 7.45E-04 7440-43-9 1.07E-03 c 9.94E-04 7440-43-9 1.07E-03 c 9.94E-04 7440-47-3 NA NA NA 7440-48-4 NA 2.19E+02 7440-48-4 NA 1.46E+02		а	1.50E+01	nc	NA		1.50E+01	NA	NA	NA		Ą
n 7429-90-5 5.11E+00 nc 3.65E+00 7440-36-0 NA 1.46E+00 7440-38-2 4.47E-04 c 4.15E-04 7440-39-3 5.21E-01 nc 5.11E-01 7440-41-7 8.00E-04 c 7.45E-04 7440-43-9 1.07E-03 c 9.94E-04 n 7440-43-9 1.07E-03 c 9.94E-04 n 7440-47-3 NA NA NA 7440-48-4 NA 2.19E+02 7440-50-8 NA 1.46E+02												
7440-36-0 NA 1.46E+00 7440-38-2 4.47E-04 c 4.15E-04 7440-39-3 5.21E-01 nc 5.11E-01 7440-41-7 8.00E-04 c 7.45E-04 7440-41-7 8.00E-04 c 7.45E-04 7440-43-9 1.07E-03 c 9.94E-04 n 7440-47-3 NA NA 7440-48-4 NA 2.19E+02 7440-50-8 NA 1.46E+02	um	7429-90-5	5.11E+00	nc	3.65E+00	nc	3.65E+00	ΑN	3.00E+04	NA	⊥	3.00E+04
m 7440-38-2 4.47E-04 c 4.15E-04 m 7440-39-3 5.21E-01 nc 5.11E-01 m 7440-41-7 8.00E-04 c 7.45E-04 n 7440-43-9 1.07E-03 c 9.94E-04 n 7440-47-3 NA NA NA nm 7440-47-3 nA 2.19E+02 7440-48-4 NA 1.46E+02	ıny	7440-36-0	NA V		1.46E+00	nc	1.46E+00	ΝA	1.50E+03	NA	_	1.50E+03
7440-39-3 5.21E-01 nc 5.11E-01 7440-43-7 8.00E-04 c 7.45E-04 7440-43-9 1.07E-03 c 9.94E-04 n 7440-70-2 NA NA n 7440-47-3 c 1.53E-04 7440-48-4 NA 2.19E+02 7440-50-8 NA 1.46E+02	0	7440-38-2	4.47E-04	ပ	4.15E-04	ပ	4.15E-04	NA	3.00E+01	NA	_	3.00E+01
7440-41-7 8.00E-04 C 7.45E-04 7440-43-9 1.07E-03 C 9.94E-04 7440-70-2 NA NA NA N 7440-47-3 C 1.53E-04 7440-48-4 NA 2.19E+02 7440-50-8 NA 1.46E+02		7440-39-3	5.21E-01	nc	5.11E-01	nc	5.11E-01	۷N	1.50E+03	ΝA	—	1.50E+03
7440-43-9 1.07E-03 c 9.94E-04 7440-70-2 NA NA 7440-47-3 c 1.53E-04 7440-48-4 NA 2.19E+02 7440-50-8 NA 1.46E+02	mr	7440-41-7	8.00E-04	၁	7.45E-04	၁	7.45E-04	ΝA	5.00E+00	WW	⊢	5.00E+00
7440-70-2 NA NA 7440-47-3 c 1.53E-04 7440-48-4 NA 2.19E+02 7440-50-8 NA 1.46E+02	um	7440-43-9	1.07E-03	ပ	9.94E-04	S .	9.94E-04	NA	3.00E+01	NA	⊢	3.00E+01
7440-47-3 c 1.53E-04 7440-48-4 NA 2.19E+02 7440-50-8 NA 1.46E+02	n	7440-70-2	ΑN		NA	ပ	NA	NA	3.00E+04	NA	Т	3.00E+04
7440-50-8 NA 2.19E+02	ium	7440-47-3		ပ	1.53E-04	ပ	1.53E-04	NA	1.50E+03	NA	Τ	1.50E+03
7440-50-8 NA 1.46E+02		7440-48-4	ΑΝ		2.19E+02	ည	2.19E+02	NA	6.00E+01	NA	⊢	6.00E+01
		7440-50-8	¥		1.46E+02	ည	1.46E+02	ΑN	3.00E+03	ΝΑ	⊢	3.00E+03
Lead 7439-92-1 ^a 1.50E+00 nc NA		7439-92-1ª	1.50E+00	υC	AN		1.50E+00	NA	1.50E+02	NA	T	1.50E+02

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	TEEL	AEGL	Source	ATV
		(hg/m³)	(c or nc)	(µg/m³)	(c or nc)	(µg/m³)	(µg/m³)	(hg/m³)	(hg/m³)	(A,T,or E)	(m/grl)
Magnesium	7439-95-4	NA		NA		¥	Ř	3.00E+04	ξ	-	3.00E+04
Manganese	7439-96-5	5.11E-02	nc	5.22E-02	20	5.11E-02	NA	3.00E+03	A A	1	3.00E+03
Nickel	7440-02-0	NA		7.30E+01	2	7.30E+01	AA	3.00E+03	A A		3.00E+03
Selenium	7782-49-2	NA		1.83E+01	nc	1.83E+01	NA	6.00E+02	A A	1	6.00E+02
Silver	7440-22-4	NA		1.83E+01	nc	1.83E+01	NA	3.00E+02	¥	-	3.00E+02
Thallium	7440-28-0	NA		2.56E-01	DC	2.56E-01	NA	3.00E+02	ΑN	_	3.00E+02
Vanadium	7440-62-2	NA		2.56E+01	2L	2.56E+01	AA	1.50E+02	ΑΝ	-	1.50E+02
Zinc	7440-66-6	NA		1.10E+03	JL	1.10E+03	NA	3.00E+04	AA	-	3.00E+04
TO-11 Carbonyls											
Formaldehyde	20-00-0	1.48E-01	C	1.39E-01	၁	1.39E-01	1.23E+03	1.23E+03	ΑΝ	Ш	1.23E+03
Acetaldehyde	75-07-0	8.73E-01	S	8.13E-01	ပ	8.13E-01	1.80E+04	1.80E+04	ΑA	Ш	1.80E+04
Acetone	67-64-1	3.65E+02	nc	3.65E+02	nc	3.65E+02	NA	2.37E+06	ΑX	⊥	2.37E+06
Acrolein	107-02-8	2.09E-02	၁ပ	2.08E-02	nc	2.08E-02	2.30E+02	2.29E+02	Ϋ́	ш	2.30E+02
Proprionaldehyde	123-38-6	ΑN		NA		NA	NA	7.50E+04	Ϋ́	F	7.50E+04
Crotonaldehyde	4170-30-3	3.54E-03	၁	3.30E-03	С	3.30E-03	5.72E+03	5.72E+03	Ϋ́	Ш	5.72E+03
Butyraldehyde	123-72-8	ΑΝ		NA		NA	NA	7.38E+04	ΑĀ	L	7.38E+04
Benzaldehyde	100-52-7	3.65E+02	JU	3.65E+02	nc	3.65E+02	NA	1.50E+04	Ϋ́	⊢	1.50E+04
Isovaleraldehyde	590-86-3	Ϋ́		NA		NA	NA	NA	ΑΝ		Ϋ́
Valeraldehyde	110-62-3	ΑΝ		NA		NA	NA	ΑN	¥		AN
o,m,p-Tolualdehyde	1334-78-7	NA		NA		ΑN	NA	Ϋ́	ΑA		AN
Hexaldehyde	66-25-1	NA		NA		NA	NA	ΑΝ	AA		ΑN
2,5-Dimethylbenzaldehyde	5779-94-2	NA		NA		NA	NA	ΑN	ΑĀ		ΑN
VOCs											
Propene	115-07-1	ΑN		ΑN		NA	NA	ΑN	ΑĀ		ΑΝ
Dichlorodifluoromethane	75-71-8	2.09E+02	υC	1.83E+02	nc	1.83E+02	NA	1.48E+07	N A	_	1.48E+07
Chlorodifluoromethane	75-45-6	5.11E+04	ဥ	5.11E+04	nc	5.11E+04	NA	4.41E+06	N A A	-	4.41E+06
Freon 114		ΑΝ		NA		NA	NA	2.10E+07	NA A	 -	2.10E+07
Chloromethane		1.07E+00	υ	1.79E+00	O	1.07E+00	NA	2.06E+05	N A	 -	2.06E+05
Vinyl Chloride		2.17E-01	O	2.09E-01	ပ	2.09E-01	NA	1.28E+04	ΑN	-	1.28E+04
1,3-Butadiene		3.74E-03	O	3.48E-03	ပ	3.48E-03	2.20E+04	2.21E+04	ΝA	ш	2.20E+04
Bromomethane		5.21E+00	пС	5.11E+00	JL	5.11E+00	NA	5.82E+04	NA	⊢	5.82E+04
Chloroethane		2.32E+00	O	2.16E+00	O	2.16E+00	NA	2.64E+06	NA	Τ	2.64E+06
Dichlorofluoromethane	75-71-8	2.09E+02	20	1.83E+02	2	1.83E+02	AA	1.48E+07	NA	L L	1.48E+07

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG		AEGL	Source	ΑTA
		(hg/m³)	(c or nc)	(m/grl)	(c or nc)	(_c m/grl)	("m/bri)	(fug/m³)	(_E m/grl)	(A,T,orE)	(m/grl)
Trichlorofluoromethane	75-69-4	7.30E+02	пс	7.30E+02	22	7.30E+02	ΑĀ	2.81E+06	¥	L	2.81E+06
Pentane	109-66-0	NA		NA		NA	NA	1.80E+06	Ϋ́	-	1.80E+06
Acrolein	107-02-8	2.09E-02	nc	2.08E-02	JL	2.08E-02	2.30E+02	2.29E+02	¥	ш	2.30E+02
1,1-Dichloroethene	75-35-4	NA	nc	3.58E-02	ပ	3.58E-02	ΝΑ	7.92E+04	Ν	_	7.92E+04
Freon 113	76-13-1	3.13E+04	nc	3.14E+04	nc	3.13E+04	ΑN	9.58E+06	¥	<u>_</u>	9.58E+06
Acetone	67-64-1	3.65E+02	nc	3.65E+02	nc	3.65E+02	NA	2.37E+06	¥	_	2.37E+06
Methyl lodide	74-88-4	ΑN		Ν		ΑN	145000	1.45E+05	¥	Ш	1.45E+05
Carbon Disulfide	75-15-0	7.30E+02	nc	7.30E+02	nc	7.30E+02	NA	3.11E+04	ΑĀ	_	3.11E+04
Acetonitrile	75-05-8	6.20E+01	nc	6.21E+01	nc	6.20E+01	NA	1.01E+05	ΝΑ	L	1.01E+05
3-Chloropropene	107-05-1	1.04E+00	nc	NA		1.04E+00	9.39E+03	9.39E+03	¥	Ш	9.39E+03
Methylene Chloride	75-09-2	4.09E+00	၁	3.79E+00	၁	3.79E+00	000969	6.94E+05	NA	Ш	6.96E+05
tert-Butyl Alcohol	75-65-0	NA		NA		NA	NA	4.55E+05	NA	T	4.55E+05
Acrylonitrile	107-13-1	2.83E-02	ပ	2.61E-02	၁	2.61E-02	21700	2.17E+04	NA	ш	2.17E+04
trans-1,2-Dichloroethene	156-60-5	7.30E+01	nc	7.30E+01	nc	7.30E+01	NA	4.95E+04	1.11E+06	A	1.11E+06
Methyl t-Butyl Ether	1634-04-4	3.13E+03	nc	3.13E+03	nc	3.13E+03	NA	4.32E+05	NA	1	4.32E+05
Hexane	110-54-3	2.09E+02	nc	2.08E+02	nc	2.08E+02	NA	5.28E+05	NA	Ţ	5.28E+05
1,1-Dichloroethane	75-34-3	5.21E+02	nc	5.11E+02	nc	5.11E+02	NA	1.21E+06	NA	1	1.21E+06
Vinyl Acetate	108-05-4	2.09E+02	nc	2.08E+02	nc	2.08E+02	19150	1.76E+04	NA	Ξ	1.92E+04
cis-1,2-Dichloroethene	156-59-2	3.65E+01	nc	3.65E+01	nc	3.65E+01	NA	7.92E+05	5.54E+05	Α	5.54E+05
2-Butanone	78-93-3	1.04E+03	nc	1.04E+03	nc	1.04E+03	NA	8.85E+05	NA	⊥	8.85E+05
Ethyl Acetate	141-78-6	3.29E+03	nc	3.29E+03	nc	3.29E+03	NA	1.44E+06	NA	T	1.44E+06
Methyl Acrylate	96-33-3	1.10E+02	၁ပ	1.10E+02	nc	1.10E+02	NA	NA	NA		NA
Chloroform	67-66-3	8.35E-02	ပ	7.73E-02	ပ	7.73E-02	NA	9.76E+03	NA	Τ	9.76E+03
1,1,1-Trichloroethane	71-55-6	1.04E+03	пc	2.30E+03	nc	1.04E+03	1.94E+06	1.91E+06	1.25E+06	Α	1.25E+06
Carbon Tetrachloride	56-23-5	1.28E-01	ပ	1.18E-01	ပ	1.18E-01	1.28E+05	1.26E+05	NA	ш	1.28E+05
1,2-Dichloroethane	107-06-2	7.39E-02	ပ	6.88E-02	ပ	6.88E-02	NA	8.08E+03	NA	T	8.08E+03
Benzene	71-43-2	2.49E-01	ပ	2.16E-01	ပ	2.16E-01	1.56E+05	1.60E+05	NA	Ш	1.56E+05
Isooctane (2,2,4-trimethylpentane)	540-84-1	AN		NA		NA	NA	3.50E+05	NA	T	3.50E+05
Heptane	142-82-5	ΑN		NA		NA	NA	1.80E+06	NA	1	1.80E+06
Trichloroethane	71-55-6	1.04E+03	၁	2.30E+03	nc	1.04E+03	1.94E+06	1.91E+06	NA	Ш	1.94E+06
Ethyl Acrylate	140-88-5	1.40E-01	ပ	ΑA		1.40E-01	¥	6.14E+04	ΑA		6.14E+04
1,2-Dichloropropane	78-87-5	9.89E-02	U	9.21E-02	ပ	9.21E-02	NA	5.08E+05	NA	T	5.08E+05
Methyl Methacrylate	80-62-6	7.30E+02	ပ	7.30E+02	2	7.30E+02	NA	4.09E+05	NA	T	4.09E+05

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	TEEL	AEGL	Source	ATV
		(µg/m³)	(c or nc)	(hg/m³)	(c or nc)	(hg/m³)	(µg/m³)	(m/gd)	(µg/m ₃)	(A,T,or E)	(µg/m ₃)
Dibromomethane	74-95-3	3.65E+01	nc	3.65E+01	ПС	3.65E+01	ΑŽ	2.50E+05	Ą	_	2.50E+05
1,4-Dioxane	123-91-1	6.11E-01	၁	5.69E-01	U	5.69E-01	¥	9.00E+04	¥	_	9.00E+04
Bromodichloromethane	75-27-4	1.08E-01	3	1.01E-01	U	1.01E-01	ΑN	4.00E+03	¥	-	4.00E+03
cis-1,3-Dichloropropene	10061-01-5	NA		NA		¥					
4-Methyl-2-Pentanone	108-10-1	8.34E+01	่วน	7.30E+01	ဥ	7.30E+01	ΑA	3.07E+05	¥	⊢	3.07E+05
Toluene	108-88-3	4.02E+02	nc	4.16E+02	nc	4.02E+02	1.88E+05	1.89E+05	¥.	ш	1.88E+05
Octane	111-65-9	NA		NA		¥	ΑN	¥	¥		A A
trans-1,3-Dichloropropene	10061-02-6	NA		6.26E-01	U	6.26E-01	A V	¥	¥		¥
Ethyl Methacrylate	97-63-2	3.29E+02	nc	3.29E+02	nc	3.29E+02	ΑĀ	¥.	¥		¥
1,1,2-Trichloroethane	79-00-5	1.20E-01	O	1.12E-01	C	1.12E-01	ΑĀ	1.64E+05	A A	L	1.64E+05
Tetrachloroethene	127-18-4	3.31E+00	O	3.13E+00	ပ	3.13E+00	ΑA	6.78E+05	ΑA	-	6.78E+05
2-Hexanone	591-78-6	Ϋ́		5.11E+00	nc	5.11E+00	Ϋ́	4.09E+04	A A	⊥	4.09E+04
Dibromochloromethane	124-48-1	8.00E-02	U	7.45E-02	င	7.45E-02	NA	6.00E+03	ΑĀ	1	6.00E+03
1,2-Dibromoethane	106-93-4	8.73E-03	ပ	8.24E-03	C	8.24E-03	ΑĀ	1.54E+05	ΑN	L	1.54E+05
Chlorobenzene	108-90-7	6.21E+01	nc	6.21E+01	nc	6.21E+01	ΑĀ	1.38E+05	ΑA	_	1.38E+05
1,1,1,2-Tetrachloroethane	630-20-6	2.60E-01	ပ	2.41E-01	၁	2.41E-01	AA	5.15E+04	AM	⊢	5.15E+04
Ethylbenzene	100-41-4	1.06E+03	nc	1.06E+03	nc	1.06E+03	ΑĀ	5.43E+05	AN	F	5.43E+05
m&p-Xylene	108-38-3 106-42-3	7.30E+02	nc	7.30E+03	JC	7.30E+02	A N	6.51E+05	A N	_	6.51E+05
o-Xylene	95-47-6	7.30E+02	nc	7.30E+03	nc	7.30E+02	AA	6.51E+05	AN AN	_	6.51E+05
Styrene	100-42-5	1.06E+03	nc	1.04E+03	nc	1.04E+03	2.13E+05	2.13E+05	AN	Ш	2.13E+05
Bromoform	75-25-2	1.75E+00	U	1.61E+00	၁	1.61E+00	AA	6.20E+03	AN	F	6.20E+03
Cumene	98-82-8	4.02E+02	ည	4.02E+02	nc	4.02E+02	NA	2.46E+05	ΑN	 -	2.46E+05
1,1,2,2-Tetrachloroethane	79-34-5	3.31E-02	U	3.13E-02	U	3.13E-02	NA	2.06E+04	ΑN	 -	2.06E+04
1,2,3-Trichloropropane	96-18-4	9.61E-04		3.13E-03	O	9.61E-04	NA	6.03E+04	ΑN	F	6.03E+04
Bromobenzene	108-86-1	1.04E+01	၁ပ	NA		1.04E+01	NA	4.82E+04	ΑN	-	4.82E+04
4-Ethyltoluene	622-96-8	¥		ΑΝ		NA	NA	1.25E+05	ΑN	_	1.25E+05
1,3,5-Trimethylbenzene	108-67-8	6.21E+00	20	6.21E+00	n C	6.21E+00	NA	3.68E+05	ΑN	_	3.68E+05
Alpha Methyl Styrene	98-83-9	2.56E+02	n S	2.56E+02	2	2.56E+02	NA	ΝA	ΑN		Ą
1,2,4-Trimethylbenzene	95-63-6	6.21E+00	ည	6.21E+00	nc	6.21E+00	NA	1.80E+05	NA	-	1.80E+05
1,3-Dichlorobenzene	541-73-1	3.29E+00	ည	3.29E+00	nc	3.29E+00	NA	3.61E+04	NA	 -	3.61E+04
1,4-Dichlorobenzene	106-46-7	3.06E-01	O	2.85E-01	O	2.85E-01		6.61E+05	NA	H	6.61E+05
Benzyl Chloride	100-44-7	3.96E-02	O	3.68E-02	٥	3.68E-02	5.20E+03	5.17E+03	NA	Ш	5.20E+03

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity	200 200 200 200 200 200 200 200 200 200					
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	里	AEGL	Source	ATV
		(_{m/grl})	(c or nc)	(µg/m³)	(c or nc)	(mg/m³)	(ˈm/grl)	(m/grl)	(ˈbg/m³)	(A,T,orE)	(mg/m³)
1,2-Dichlorobenzene	95-50-1	2.09E+02	nc	3.29E+02	JL	2.09E+02	AA	3.01E+05	AN	T	3.01E+05
Hexachlorethane	67-72-1	4.80E-01	၁	4.47E-01	ပ	4.47E-01	NA	2.90E+04	AA	⊢	2.90E+04
1,2,4-Trichlorobenzene	120-82-1	2.08E+02	nc	2.08E+02	nc	2.08E+02	Ν	3.71E+04	ΑĀ	۲	3.71E+04
Hexachlorobutadiene	87-68-3	8.62E-02	၁	8.03E-02	၁	8.03E-02	3.21E+04	3.20E+04	ΑĀ	ш	3.21E+04
Hydrocarbons											
Methane	74-82-8	NA		NA		NA	¥	3.30E+06	¥	⊢	3.30E+06
Ethylene	74-85-1	NA		NA		NA	ΑA	4.60E+05	ΑĀ	<u></u>	4.60E+05
Acetylene	74-86-2	NA		. NA		NA	NA	ΝΑ	ΑĀ		¥
Ethane	74-84-0	NA		NA		NA	NA	ΝA	ΑA		¥
Propylene	115-07-1	NA		NA		NA	NA	ΑN	ΑĀ		¥
Propane	74-98-6	ΑA		NA		NA	NA	3.78E+06	NA	—	3.78E+06
Propyne (methyl acetylene)	74-99-7	NA		NA		NA	NA	2.79E+06	NA	L	2.79E+06
Isobutane	75-28-5	NA		NA		NA	NA	9.52E+05	AA	⊢	9.52E+05
1-Butene/Isobutylene (115-11-7)	106-98-9	NA		NA		NA	NA	6.87E+06	NA	۲	6.87E+06
1,3-Butadiene/butane	106-99-0	3.74E-03	ပ	3.48E-03	၁	3.48E-03	2.20E+04	2.21E+04	NA	ш	2.20E+04
cis-butene	25167-67-3	NA		NA		NA	NA	1.72E+04	NA	⊢	1.72E+04
1-Butyne/trans-Butene	25167-67-3	NA		NA		NA	NA	1.72E+04	NA	F	1.72E+04
2-Butyne (crotonylene)	503-17-3	NA V		NA		NA	NA	NA	NA		¥.
n-Pentane	109-66-0	ΝA		NA		NA	NA	1.80E+06	NA	T	1.80E+06
n-Hexane	110-54-3	2.09E+02	nc	2.08E+02	nc	2.08E+02	NA	5.28E+05	ΝA	-	5.28E+05
SVOCs											
n-nitrosodimethylamine	62-72-9	1.37E-04	ပ	1.23E-04	၁	1.23E-04	NA	2.50E+03	ΑN	F	2.50E+03
bis(2-chloroethyl)ether	111-44-4	5.82E-03	ပ	5.69E-03	ပ	5.69E-03	NA	5.85E+04	NA	L	5.85E+04
phenol	108-95-2	2.19E+03	၁ပ	2.19E+03	ည	2.19E+03	NA	3.85E+04	NA	Τ	3.85E+04
2-chlorophenol	95-57-8	1.83E+01	nc	1.83E+01	nc	1.83E+01	NA	5.25E+03	NA	Τ	5.25E+03
1,3-Dichlorobenzene	541-73-1	3.29E+00	ည	3.29E+00	nc	3.29E+00	NA	3.61E+04	NA	⊥	3.61E+04
1,4-dichlorobenzene	106-46-7	3.06E-01	ပ	2.85E-01	၁	2.85E-01	NA	6.61E+05	NA	T	6.61E+05
1,2-dichlorobenzene	95-50-1	2.09E+02	ည	3.29E+02	nc	2.09E+02	NA	3.01E+05	NA	_	3.01E+05
benzyl alcohol	100-51-6	1.10E+03	၁ပ	1.10E+03	nc	1.10E+03	NA	5.53E+04	NA	Ţ	5.53E+04
bis(2-chloroisopropyl)ether	108-60-1	1.92E-01	O	1.79E-01	S	1.79E-01	NA	6.99E+04	NA	Τ	6.99E+04
2-methylphenol	95-48-7	1.83E+02	ည	1.83E+02	၁	1.83E+02	NA	ΑN	NA		ΝA
hexachloroethane	67-72-1	4.80E-01	ပ	4.47E-01	ပ	4.47E-01	NA	2.90E+04	NA	⊢	2.90E+04
n-nitroso-di-n-propylamine	621-64-7	9.61E-04	٥	8.94E-04	٥	8.94E-04	¥	2.00E+02	¥N	┺	2.00E+02
											1

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	TEEL	AEGL	Source	ATV
		(mg/m ₃)	(c or nc)	(hg/m³)	(c or nc)	(ng/m ₃)	(µg/m ₃)	(µg/m³)	(µg/m ₃)	(A,T,or E)	(mg/m ₃)
4-methylphenol	106-44-5	1.83E+02	nc	1.83E+01	ည	1.83E+01	¥	Ą	ΑĀ		¥
nitrobenzene	98-95-3	2.09E+00	nc	2.19E+00	ည	2.09E+00	NA NA	1.51E+04	A A	-	1.51E+04
isophorone	78-59-1	7.08E+00	၁	6.59E+00	၁	6.59E+00	ΝΑ	2.83E+04	¥ ∀	 -	2.83E+04
2-nitrophenol	88-75-5	¥		NA		NA	Ϋ́	ΑN	ΑA		¥
2,4-dimethylphenol	105-67-9	7.30E+01	n C	7.30E+01	nc	7.30E+01	NA	ΑN	¥		ΑN
bis(2-chloroethoxy)methane	111-91-1	WA		NA		NA	Ϋ́	ΑΝ	ΑĀ		NA NA
2,4-dichlorophenol	120-83-2	1.10E+01	nc	1.10E+01	пс	1.10E+01	NA	3.00E+04	ΑN	-	3.00E+04
1,2,4-trichlorobenzene	120-82-1	2.08E+02	nc	2.08E+02	nc	2.08E+02	Ϋ́	3.71E+04	NA	-	3.71E+04
naphthalene	91-20-3	3.13E+00	nc	3.29E+00	nc	3.13E+00	Ν	7.86E+04	ΑA	-	7.86E+04
4-chloroaniline	106-47-8	1.46E+01	nc	1.46E+01	nc	1.46E+01	NA	3.00E+04	ΑĀ	F	3.00E+04
hexachlorobutadiene	87-68-3	8.62E-02	S	8.03E-02	ပ	8.03E-02	3.21E+04	3.20E+04	A A	Ш	3.21E+04
4-chloro-3-methylphenol	29-20-2	¥		Ϋ́		NA	NA	2.00E+04	ΑĀ		2.00E+04
2-methylnaphthalene	91-57-6	¥		7.30E+01	၁၁	7.30E+01	NA	2.00E+04	NA	F	2.00E+04
hexachlorocyclopentadiene	77-47-4	7.30E-02	C	7.30E-02	nc	7.30E-02	NA	2.23E+02	A A	-	2.23E+02
2,4,6-trichlorophenol	88-06-2	6.20E-01	S	6.26E-01	ပ	6.20E-01	NA	3.00E+04	NA	-	3.00E+04
2,4,5-trichlorophenol	95-95-4	3.65E+02	nc	3.65E+02	nc	3.65E+02	NA	3.00E+04	A A	 	3.00E+04
2-chloronaphthalene	91-58-7	2.92E+02	nc	2.92E+02	nc	2.92E+02	NA	6.00E+02	AA	-	6.00E+02
2-nitroaniline	88-74-4	2.09E-01	nc	2.08E-01	JU	2.08E-01	NA	NA	AA		AN
Acenaphthylene	208-96-8	¥		ΝΑ		NA	NA	2.00E+02	NA	_	2.00E+02
dimethylphthalate	131-11-3	3.65E+04	22	3.65E+04	DC	3.65E+04	NA	1.50E+04	NA	F	1.50E+04
2,6-dinitrotoluene	606-20-2	3.65E+00	22	3.65E+00	DL	3.65E+00	ΑA	6.00E+02	NA	⊢	6.00E+02
acenaphthene	83-32-9	2.19E+02	ည	2.19E+02	DC	2.19E+02	NA	1.25E+03	NA	⊥	1.25E+03
3-nitroaniline		NA		¥N PA		ΑN	NA	NA	NA		NA
2,4-dinitrophenol	ı	7.30E+00		7.30E+00	22	7.30E+00	N A	7.50E+03	NA	Τ	7.50E+03
dibenzofuran	- 1	1.46E+01	22	1.46E+01	nc	1.46E+01	NA	NA	NA		ΑN
2,4-dinitrotoluene		7.30E+00	22	7.30E+00	ПС	7.30E+00	NA	6.00E+02	NA	-	6.00E+02
4-nitrophenol	\prod	2.92E+01	ည	2.92E+01	ည	2.92E+01	NA	3.00E+04	ΑN	-	3.00E+04
Fluorene		1.46E+02	ဥ	1.46E+02	ည	1.46E+02	NA	7.50E+04	AN	 -	7.50E+04
4-chlorophenyl-phenylether	7005-72-3	ΝΑ		Ϋ́		NA	NA	AN	NA		A A
diethylphthalate	84-66-2	2.92E+03	JC	2.92E+03	nc	2.92E+03	NA	1.50E+04	AN	F	1.50E+04
4-nitroaniline	100-01-6	₹		¥		AA	AN	9.00E+03	NA	T	9.00E+03
4,6-dinitro-2-methylphenol	534-52-1	AA		3.65E-01	22	3.65E-01	Ϋ́	5.00E+02	NA	T	5.00E+02
n-nitrosodiphenylamine(1)	86-30-6	1.37E+00	٥	1.28E+00	٥	1.28E+00	NA	AN	AN		ΑΝ

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Toxicity	Region 3	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	固	AEGL	Source	Ā
		("m/bri)	(c or nc)	(mg/m ₃)	(c or nc)	(fm/brl)	(mg/m³)	(m/gh)	(mg/m³)	(A,T,or E)	(µg/m³)
4-bromophenyl-phenylether	101-55-3	Ϋ́		ΑĀ		Ϋ́	ΑŽ	¥	ΑĀ		₹
hexachlorobenzene	118-74-1	4.18E-03	ပ	3.91E-03	၁	3.91E-03	NA	7.50E+01	NA	Т	7.50E+01
pentachlorophenol	87-86-5	5.60E-02	ပ	5.22E-02	ပ	5.22E-02	NA	1.50E+03	NA	T	1.50E+03
phenanthrene	85-01-8	NA		NA		NA	NA	2.00E+03	ΑN	T	2.00E+03
anthracene	120-12-7	1.10E+03	nc	1.10E+03	nc	1.10E+03	NA	6.00E+03	NA	1	6.00E+03
di-n-butylphthalate	84-74-2	3.65E+02	nc	3.65E+02	nc	3.65E+02	NA	1.50E+04	NA	T	1.50E+04
fluoranthene	206-44-0	1.46E+02	JU	1.46E+02	nc	1.46E+02	NA	3.00E+01	NA	1	3.00E+01
pyrene	129-00-0	1.10E+02	nc	1.10E+02	nc	1.10E+02	NA	1.50E+04	A	T	1.50E+04
butylbenzylphthalate	85-68-7	7.30E+02	2	7.30E+02	nc	7.30E+02	ΑA	5.00E+05	ΑN	Ţ	5.00E+05
benzo(a)anthracene	56-55-3	2.17E-02	ပ	8.58E-03	ပ	8.58E-03	NA	6.00E+02	NA	T	6.00E+02
chrysene	218-01-9	2.17E+00		8.58E-01	3	8.58E-01	NA	2.00E+02	NA	T	2.00E+02
bis(2-ethylhexyl)phthalate	117-81-7	4.80E-01		4.47E-01	၁	4.47E-01	NA	1.00E+04	NA	Τ	1.00E+04
di-n-octylphthalate	117-84-0	7.30E+01	nc	7.30E+01	nc	7.30E+01	NA	1.50E+05	NA		1.50E+05
benzo(b)fluoranthene	205-99-2	2.17E-02	C	8.58E-03	C	8.58E-03	ΝA	NA	NA		NA
benzo(k)fluoranthene	207-08-9	2.17E-01	၁	8.58E-02	၁	8.58E-02	NA	NA	NA		NA
benzo(a)pyrene	50-32-8	2.17E-03	၁	2.02E-03	3	2.02E-03	NA	7.50E+03	NA	T	7.50E+03
indeno(1,2,3-cd)pyrene	193-39-5	2.17E-02	C	8.58E-03	ပ	8.58E-03	NA	NA	NA		NA
dibenz(a,h)anthracene	53-70-3	2.17E-03	ပ	8.58E-04	၁	8.58E-04	NA	3.00E+04	NA	T	3.00E+04
benzo(g,h,i)perylene	191-24-2	¥		AA		NA	NA	3.00E+04	NA	T	3.00E+04
TO-13 (PAHS)											
naphthalene	91-20-3	3.13E+00	nc	3.29E+00	nc	3.13E+00	NA	7.86E+04	NA	⊥	7.86E+04
acenaphthylene	208-96-8	NA		NA		NA	NA	2.00E+02	NA	⊥	2.00E+02
Acenaphthene	83-32-9	2.19E+02	nc	2.19E+02	nc	2.19E+02	NA	1.25E+03	ΝA	⊥	1.25E+03
fluorene	86-73-7	1.46E+02	ည	1.46E+02	ည	1.46E+02	¥	7.50E+04	Ϋ́	_	7.50E+04
phenanthrene	85-01-8	NA		NA		ΑĀ	Ϋ́	2.00E+03	¥	—	2.00E+03
anthracene	120-12-7	1.10E+03	nc	1.10E+03	nc	1.10E+03	¥	6.00E+03	¥	⊢	6.00E+03
fluoranthene	206-44-0	1.46E+02	nc	1.46E+02	nc	1.46E+02	NA	3.00E+01	NA	T	3.00E+01
pyrene	129-00-0	1.10E+02	nc	1.10E+02	nc	1.10E+02	NA	1.50E+04	NA	1	1.50E+04
benzo(a)anthracene	56-55-3	2.17E-02	၁	8.58E-03	င	8.58E-03	NA	6.00E+02	NA	1	6.00E+02
chrysene	218-01-9	2.17E+00		8.58E-01	С	8.58E-01	NA	2.00E+02	NA	T	2.00E+02
benzo(b)fluoranthene	205-99-2	2.17E-02		8.58E-03	၁	8.58E-03	NA	NA	NA		NA
benzo(k)fluoranthene	207-08-9	2.17E-01	ပ	8.58E-02	၁	8.58E-02	ΝA	NA	NA		NA
Benzo(e)pyrene	192-97-2	NA		NA		NA	ΑΝ	NA	AN		ΑN

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Tovicity	Region 3	Tovicity						
Compound	CAS#		Endpoint	RBC	Endpoint	HBSL	ERPG	担	AEGL	Source	ATV
		(hg/m³)	(c or nc)	(hg/m ₃)	(c or nc)	(mg/m ₃)	(µg/m ₃)	(µg/m³)	(µg/m ₃)	(A,T,orE)	(mg/m ₃)
benzo(a)pyrene	50-32-8	2.17E-03	ပ	2.02E-03	U	2.02E-03	ΑA	7.50E+03	ΑN	-	7.50E+03
indeno(1,2,3-cd)pyrene	193-39-5	2.17E-02	ပ	8.58E-03	ပ	8.58E-03	ΑA	Ą	A A		Ϋ́
dibenz(a,h)anthracene	53-70-3	2.17E-03	၁	8.58E-04	၁	8.58E-04	NA	3.00E+04	ΑĀ	_	3.00E+04
benzo(g,h,i)perylene	191-24-2	NA		NA		Ϋ́	ΑA	3.00E+04	AA	-	3.00E+04
Dioxins and Furans											
2378-Tetrachlorodibenzo-p-dioxin	1746-01-6	4.48E-08	ပ	4.17E-08	U	4.17E-08	ΑN	3.50E+00	A A	-	3.50E+00
12378-Pentachlorodibenzo-p-dioxin	40321-76-4	NA		NA		NA	NA	2.50E+00	ΑN	⊢	2.50E+00
123478-Hexachlorodibenzo-p-dioxin	39227-28-6	NA		۷V		ΑΝ	ΝΑ	ΑΝ	NA		ΑN
123678-Hexachlorodibenzo-p-dioxin		NA		ΝA		ΑN	ΑA	1.50E+01	ΑN	۲	1.50E+01
123789-Hexachlorodibenzo-p-dioxin	19408-74-3	1.48E-06	ပ	1.38E-06	3	1.38E-06	NA	ΑΝ	ΑĀ		ΑN
1234678-Heptachlorodibenzo-p-dioxin 35822-46-9	n 35822-46-9	N A		NA		NA	NA	ΑN	ΑĀ		ΥZ
Octachlorodibenzo(p)dioxin	3268-87-9	AA		NA		NA	NA	1.50E+02	ΑN	_	1.50E+02
2378-Tetrachlorodibenzo-p-furan	51207-31-9	NA		NA		NA	NA	2.00E+00	¥	-	2.00E+00
12378-Pentachlorodibenzo-p-furan	57117-41-6	NA		NA		NA	Ν	ΑN	¥		Ϋ́
23478-Pentachlorodibenzo-o-furan	57117-31-4	NA		NA		AN	NA	7.50E-02	ΑĀ	⊢	7.50E-02
123478-Hexachlorodibenzo-p-furan	70648-26-9	NA		NA		NA	NA	7.50E+00	ΑĀ	F	7.50E+00
123678-Hexachlorodibenzo-p-furan	57117-44-9	NA		NA		NA	NA	2.50E+00	ΑA	F	2.50E+00
123789-Hexachlorodibenzo-p-furan	72918-21-9	A A		NA		NA	NA	NA	NA		ΑN
234678-Hexachlorodibenzo-p-furan		NA NA		NA		NA	NA	1.50E+00	ΑA	 -	1.50E+00
1234678-Heptachlorodibenzo-p-furan	67562-39-4	NA NA		NA		AN	NA	AN	ΑĀ		Ϋ́Z
1234789-Heptachlorodibenzo-p-furan		ΑN		NA		AN	NA	AN	Ϋ́		Ϋ́
Octachlorodibenzofuran	39001-02-0	NA		NA		AN	ΑN	3.00E+02	ΑĀ	L	3.00E+02
Energetics											
Nitrobenzene	98-95-3	2.09E+00	nc	2.19E+00	่วน	2.09E+00	ΑA	1.51E+04	ΑĀ	⊥	1.51E+04
2-Nitrotoluene	88-72-2	3.65E+01	nc	3.65E+01	วน	3.65E+01	Ν A	ΑN	NA NA		ΑΝ
3-Nitrotoluene	99-08-1	3.65E+01	nc	7.30E+01	วน	3.65E+01	ΝΑ	AA	ΑA		ΑN
4-Nitrotoluene	99-99-0	3.65E+01	nc	3.65E+01	ЭU	3.65E+01	ΑĀ	3.37E+04	NA	-	3.37E+04
Nitroglycerine	55-63-0	4.80E-01		4.47E-01		4.47E-01	ΑA	AA	A A		AN
1,3-Dinitrobenzene	99-65-0	3.65E-01	nc	3.65E-01	วน	3.65E-01	۸A	3.00E+03	¥	L	3.00E+03
2,6-Dinitrotoluene	606-20-2	3.65E+00	၁ပ	3.65E+00	nc	3.65E+00	NA	6.00E+02	ΑĀ	 -	6.00E+02
2,4-Dinitrotoluene	121-14-2	7.30E+00	ည	7.30E+00	JU	7.30E+00	NA	6.00E+02	NA		6.00E+02
1,3,5-Trinitrobenzene	99-35-4	1.10E+02	nc	1.10E+02	ည	1.10E+02	NA	3.00E+04	NA	-	3.00E+04
2,4,6-Trinitrotoluene	118-96-7	2.24E-01	ပ	2.09E-01	၁	2.09E-01	NA	2.50E+04	NA	F	2.50E+04

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		Region 9	Region 9 Toxicity	Region 3 Toxicity	Toxicity						
Compound	CAS#	PRG	Endpoint	RBC	Endpoint	HBSL	ERPG	1991	AEGL	Source	ATV
		(µg/m³)	(c or nc)	(µg/m³)	(c or nc)	(m/grl)	(m/grl)	(_{m/grl})	(ng/m³)	(A,T,or E)	(m/grl)
RDX	121-82-4	6.11E-02	ပ	5.69E-02	ပ	5.69E-02	ΑĀ	Ϋ́	Ψ		NA
4-Amino-2,6-Dinitrotoluene	19406-51-0	Ν		ΝA		¥	Α	ΑŽ	A A		Ą
2-Amino-2,6-Dinitrotoluene	35572-78-2	NA		NA A		¥	ΑN	1.50E+04	¥	F	1.50E+04
Tetryi	479-45-8	3.65E+01	ဥ	3.65E+01	ည	3.65E+01	ΑĀ	Ϋ́	ΑN		ΑX
XMH	2691-41-0 1.83E-	1.83E+02	ည	1.83E+02	ည	1.83E+02	ΑĀ	Ϋ́	AM		A A
Pentaerythritoltetranitrate	78-11-5	NA		NA A		¥	¥	5.00E+01	A	-	5.00E+01
Dibutyl Phthalate	84-74-2	3.65E+02	2	3.65E+02	ည	3.65E+02	¥	1.50E+04	Ą	L	1.50E+04
Dioctyl Phthalate	117-81-7	4.80E-01	၁	4.47E-01	ပ	4.47E-01	¥	1.00E+04	ΑN	F	1.00E+04
Diphenylamine	122-39-4	9.13E+01	2	9.13E+01	2	9.13E+01	¥	3.00E+04	AA	⊢	3.00E+04
Footnotes.											

cornotes:

 $^{\rm a}$ = National Ambient Air Quality Standard (NAAQS) value used PRG = Preliminary Remediation Goals

c = cancer

nc = non-cancer

RBC = Risk-Based Concentration

HBSL = Health-Based Screening Level

(E) ERPG = Emergency Response Planning Guidelines

(T) TEEL = Temporary Emergency Exposure Limits

(A) AEGL = Acute Exposure Guideline Level

ATV = Acute Toxicity Value

NA = Not Available

APPENDIX D RISK EVALUATION DATA

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	, 5.56-mm I	Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 12
Permanent Gases								
Ammonia (NH3)	1.04E+01	1.04E+02	9.99E-02	no	6.33E+01	1.75E+04	3.62E-03	OU
Carbon Dioxide (CO2)	4.07E+02	N		na	8.90E+03	5.40E+07	1.83E-04	ou
Carbon Monoxide (CO)	7.61E+02	1.00E+04	7.61E-02	2	4.63E+03	2.30E+05	2.01E-02	ou
Oxides of Nitrogen (as NO)	4.63E+00	1.00E+02	4.63E-02	2	1.13E+02	3.08E+04	3.66E-03	no
Sulfur Dioxide (SO2)	Α _Ν	8.00E+01		na	NA	7.89E+02		na
Acid Gases								
Hydrogen fluoride	Ϋ́	N		na	VΝ	1.60E+03		na
Hydrogen chloride	ΑΝ	2.08E+01		na	NA	2.70E+03		na
Hydrogen bromide	ΑΝ	NΛ		na	ΑN	9.93E+03		na
Nitric Acid	¥	N.		na	AN	1.30E+03		na
Phosphoric acid	Ϋ́	1.04E+01		па	ΑN	3.00E+03		na
Sulfuric Acid	AN	N		па	NA	2.00E+03		na
Cyanide								
Particulate Cyanide	6.25E-03	7.30E+01	8.56E-05	ပ	1.52E-01	5.00E+03	3.04E-05	on
Hydrogen Cyanide	9.39E+00	3.13E+00	3.00E+00	yes	2.28E+02	5.17E+03	4.42E-02	2
Particulates								
Total Suspended Particulate	1.85E+01	5.00E+01	3.71E-01	2	1.13E+02	NA		na
PM10	1.83E+01	5.00E+01	3.66E-01	20	1.11E+02	NA		na
PM2.5	1.37E+01	1.50E+01	9.16E-01	2	8.35E+01	NA NA		na
Metals								
Aluminum	9.52E-02	3.65E+00	2.61E-02	2	2.31E+00	3.00E+04	7.72E-05	2
Antimony	6.80E-01	1.46E+00	4.66E-01	2	1.65E+01	1.50E+03	1.10E-02	2
Arsenic	AN	4.15E-04		па	ΝΑ	3.00E+01		na
Barium	2.35E-01	5.11E-01	4.60E-01	20	5.72E+00	1.50E+03	3.81E-03	no
Beryllium	AN	7.45E-04		na	NA	5.00E+00		па
Cadmium	NA	9.94E-04		na	Ϋ́	3.00E+01		na
Calcium	2.52E-01	NV		na	6.13E+00	3.00E+04	2.04E-04	on O
Chromium	NA	1.53E-04		na	ΑN	1.50E+03		na
Cobalt	NA	2.19E+02		g	ΑN	6.00E+01		na
Copper	6.72E+00	1.46E+02	4.60E-02	2	1.63E+02	3.00E+03	5.45E-02	ဥ
Lead	2.91E+00	1.50E+00	1.94E+00	yes	7.08E+01	1.50E+02	4.72E-01	2

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	e, 5.56-mn	Tur	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Magnesium	3.88E-02	N		na	9.43E-01	3.00E+04	3.14E-05	2
Manganese	NA	5.11E-02		na	Ϋ́Z	3.00E+03		na
Nickel	A A	7.30E+01		na	ΑN	3.00E+03		na
Selenium	5.66E-03	1.83E+01	3.10E-04	on	1.38E-01	6.00E+02	2.29E-04	2
Silver	N A	1.83E+01		na	Ϋ́	3.00E+02		па
Thallium	NA V	2.56E-01		na	ξ	3.00E+02		na
Vanadium	NA	2.56E+01		na	Ϋ́Ν	1.50E+02		na
Zinc	9.20E-01	1.10E+03	8.40E-04	no	2.24E+01	3.00E+04	7.46E-04	2
TO-11 Carbonyls								
Formaldehyde	7.62E-02	1.39E-01	5.48E-01	2	1.08E+00	1.23E+03	8.80E-04	2
Acetaldehyde	4.79E-02	8.13E-01	5.89E-02	no	6.80E-01	1.80E+04	3.78E-05	2
Acetone	1.52E-01	3.65E+02	4.15E-04	2	3.69E+00	2.37E+06	1.56E-06	2
Acrolein	A N	2.08E-02		na	ΑN	2.30E+02		na
Proprionaldehyde	A A	N		na	NA	7.50E+04		na
Crotonaldehyde	¥	3.30E-03		na	NA	5.72E+03		na
Butyraldehyde	ΑĀ	N		na	NA	7.38E+04		na
Benzaldehyde	ΑN	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	Ϋ́	N<		na	NA	NA		па
Valeraldehyde	ΑN	N<		na	NA	AN		пa
o,m,p-Tolualdehyde	ΑN	N<		Б	Y V	NA		па
Hexaldehyde	₹N	>N		па	A A	NA		na
2,5-Dimethylbenzaldehyde	ΨN.	2		na	¥	NA		na
VOCs								
Propene	2.90E-02	>N		na	1.76E-01	NA		na
Dichlorodifluoromethane	1.61E-04	1.83E+02	8.82E-07	no	3.92E-03	1.48E+07	2.64E-10	00
Chlorodifluoromethane	AN	5.11E+04		na	NA	4.41E+06		na
Freon 114	A A	N<		na	NA	2.10E+07		na
Chloromethane	5.55E-06	1.07E+00	5.20E-06	2	3.15E-04	2.06E+05	1.53E-09	20
Vinyl Chloride	ΑN	2.09E-01		па	NA	1.28E+04		na
1,3-Butadiene	2.15E-03	3.48E-03	6.19E-01	2	3.06E-02	2.20E+04	1.39E-06	2
Bromomethane	ΨZ	5.11E+00		БП	ΑN	5.82E+04		па
Chloroethane	AZ AZ	2.16E+00		пa	NA NA	2.64E+06		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	, 5.56-mn	Tun JOOD	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
Dichlorofluoromethane	NA	1.83E+02		na	NA	1.48E+07		na
Trichlorofluoromethane	6.94E-05	7.30E+02	9.50E-08	no	1.69E-03	2.81E+06	6.02E-10	ou
Pentane	NA	۸N		na	NA	1.80E+06		na
Acrolein	1.71E-02	2.08E-02	8.24E-01	no	1.04E-01	2.30E+02	4.53E-04	92
1,1-Dichloroethene	Ϋ́	3.58E-02		na	W	7.92E+04		na
Freon 113	NA	3.13E+04		na	NA	9.58E+06		na
Acetone	NA	3.65E+02		na	NA	2.37E+06		na
Methyl lodide	NA	NV		na	NA	1.45E+05		na
Carbon Disulfide	AN	7.30E+02		na	NA	3.11E+04		na
Acetonitrile	6.14E-02	6.20E+01	9.91E-04	no	1.49E+00	1.01E+05	1.48E-05	no
3-Chloropropene	NA	1.04E+00		na	NA	9.39E+03		na
Methylene Chloride	1.10E-02	3.79E+00	2.89E-03	no	1.56E-01	6.96E+05	2.24E-07	on
tert-Butyl Alcohol	ΑN	۸N		na	NA	4.55E+05		па
Acrylonitrile	8.67E-03	2.61E-02	3.32E-01	20	1.23E-01	2.17E+04	5.67E-06	on
trans-1,2-Dichloroethene	NA	7.30E+01		na	ΑN	1.11E+06		na
Methyl t-Butyl Ether	ΑΝ	3.13E+03		na	Α	4.32E+05		na
Hexane	NA	2.08E+02		na	¥	5.28E+05		na
1,1-Dichloroethane	NA	5.11E+02		na	NA	1.21E+06		na
Vinyl Acetate	NA	2.08E+02		na	ΝA	1.92E+04		na
cis-1,2-Dichloroethene	NA	3.65E+01		na	¥	5.54E+05		na
2-Butanone	4.87E-04	1.04E+03	4.67E-07	2	1.18E-02	8.85E+05	1.34E-08	no
Ethyl Acetate	9.84E-03	3.29E+03	3.00E-06	2	2.39E-01	1.44E+06	1.66E-07	no
Methyl Acrylate	ΝΑ	1.10E+02		na	NA	NA		na
Chloroform	NA	7.73E-02		na	A A	9.76E+03		na
1,1,1-Trichloroethane	NA	1.04E+03		na	NA	1.25E+06		na
Carbon Tetrachloride	NA	1.18E-01		na	NA	1.28E+05		na
1,2-Dichloroethane	1.58E-03	6.88E-02	2.29E-02	no	8.95E-02	8.08E+03	1.11E-05	no
Benzene	1.02E-01	2.16E-01	4.75E-01	2	1.45E+00	1.56E+05	9.32E-06	on
Isooctane (2,2,4-trimethylpentane)	Ϋ́	N		na	AA	3.50E+05		na
Heptane	3.07E-05	N		na	7.46E-04	1.80E+06	4.13E-10	2
Trichloroethane	Αχ	1.04E+03		na	¥	1.94E+06		na
Ethyl Acrylate	A V	1.40E-01		Па	¥ V	6.14E+04		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	, 5.56-mn I	Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	(2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асите} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
1,2-Dichloropropane	NA	9.21E-02		na	ΑΝ	5.08E+05		па
Methyl Methacrylate	A A	7.30E+02		па	ΑN	4.09E+05		ББ
Dibromomethane	NA	3.65E+01		Б	ΑN	2.50E+05		БП
1,4-Dioxane	N A	5.69E-01		na	Ϋ́	9.00E+04		na
Bromodichloromethane	A V	1.01E-01		na	ΑN	4.00E+03		na
cis-1,3-Dichloropropene	A A	NV		na	¥			na
4-Methyl-2-Pentanone	A A	7.30E+01		na	NA	3.07E+05		na
Toluene	1.09E-02	4.02E+02	2.71E-05	20	6.63E-02	1.88E+05	3.53E-07	2
Octane	ΑN	N		na	NA	ΑN		na
trans-1,3-Dichloropropene	ΑN	6.26E-01		na	NA	ΑN		na
Ethyl Methacrylate	NA	3.29E+02		na	NA	ΑN		na
1,1,2-Trichloroethane	AA	1.12E-01		na	ΑN	1.64E+05		БП
Tetrachloroethene	A A	3.13E+00		na	Ϋ́	6.78E+05		na
2-Hexanone	Ä	5.11E+00		na	ΑN	4.09E+04		па
Dibromochloromethane	ΑN	7.45E-02		na	NA	6.00E+03		na
1,2-Dibromoethane	Ϋ́	8.24E-03		na	NA	1.54E+05		na
Chlorobenzene	ΑN	6.21E+01		na	NA	1.38E+05		na
1,1,1,2-Tetrachloroethane	A A	2.41E-01		na	NA	5.15E+04		na
Ethylbenzene	A	1.06E+03		na	NA	5.43E+05		na
m&p-Xylene	ΑN	7.30E+02		na	NA	6.51E+05		na
o-Xylene	ΑN	7.30E+02		па	AA	6.51E+05		na
Styrene	3.87E-03	1.04E+03	3.71E-06	2	2.35E-02	2.13E+05	1.11E-07	2
Bromoform	ΑN	1.61E+00		па	NA	6.20E+03		na
Cumene	A V	4.02E+02		na	NA	2.46E+05		na
1,1,2,2-Tetrachloroethane	Ą	3.13E-02	3	na	NA	2.06E+04		па
1,2,3-Trichloropropane	ΑΝ	9.61E-04		na	NA	6.03E+04		na
Bromobenzene	ΑN	1.04E+01		па	NA	4.82E+04		na
4-Ethyltoluene	Ϋ́	>N		па	NA	1.25E+05		na
1,3,5-Trimethylbenzene	¥N V	6.21E+00		na	Ϋ́	3.68E+05		na
Alpha Methyl Styrene	ΨZ.	2.56E+02		па	Α _N	NA		na
1,2,4-Trimethylbenzene	₹ Z	6.21E+00		Б	ΑN	1.80E+05		na
1,3-Dichlorobenzene	A V	3.29E+00		па	A A	3.61E+04		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	, 5.56-mn	Tun JODI	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	(2)	
Compound	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
1,4-Dichlorobenzene	ΑN	2.85E-01		па	ΑĀ	6.61E+05		na
Benzyl Chloride	NA	3.68E-02		na	NA	5.20E+03		na
1,2-Dichlorobenzene	ΝΑ	2.09E+02		na	Ϋ́	3.01E+05		na
Hexachlorethane	NA	4.47E-01		na	Ϋ́	2.90E+04		na
1,2,4-Trichlorobenzene	ΝA	2.08E+02		na	۸	3.71E+04		na
Hexachlorobutadiene	ΑN	8.03E-02		na	ΑN	3.21E+04		na
Hydrocarbons								
Methane	4.17E+00	≥N		na	1.01E+02	3.30E+06	3.07E-05	2
Ethylene	2.35E-01	N		na	5.72E+00	4.60E+05	1.24E-05	٤
Acetylene	3.12E-02	ΛN		na	1.90E-01	ΑN		na
Ethane	1.20E-01	ΛN		na	7.28E-01	ΝΑ		na
Propylene	4.10E-02	N		na	2.49E-01	¥N		na
Propane	ΑN	N		па	¥	3.78E+06		na
Propyne (methyl acetylene)	NA	NV		na	NA	2.79E+06		na
Isobutane	NA	NV		na	NA	9.52E+05		na
1-Butene/Isobutylene (115-11-7)	Ϋ́	NV		na	NA	6.87E+06		na
1,3-Butadiene/butane	NA	3.48E-03		na	NA	2.20E+04		na
cis-butene	NA	NV		na	NA	1.72E+04		na
1-Butyne/trans-Butene	NA	NV		na	NA	1.72E+04		na
2-Butyne (crotonylene)	ΝΑ	NV		na	NA	NA		na
n-Pentane	ΑN	NV		na	¥	1.80E+06		na
n-Hexane	NA	2.08E+02		na	NA	5.28E+05		na
SVOCs								
n-nitrosodimethylamine	NA	1.23E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	NA	5.69E-03		na	NA	5.85E+04		na
phenol	NA	2.19E+03		na	NA	3.85E+04		na
2-chlorophenol	NA	1.83E+01		na	NA	5.25E+03		na
1,3-Dichlorobenzene	AN	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	A A	2.85E-01		na	Α	6.61E+05		na
1,2-dichlorobenzene	A V	2.09E+02		Б	ΑA	3.01E+05		na
benzyl alcohol	Ϋ́	1.10E+03		na	¥	5.53E+04		па
bis(2-chloroisopropyl)ether	Ϋ́	1.79E-01		ē	¥	6.99E+04		Б

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	e, 5.56-mn	Tun	n Tungsten Ba	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2)	2)	
			֓֞֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֡֓֓֡֓֓		S. Auga			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 1?
2-methylphenol	NA	1.83E+02		па	ΑĀ	ΑN		na
hexachloroethane	NA	4.47E-01		E	ΑN	2.90E+04		na
n-nitroso-di-n-propylamine	NA	8.94E-04		па	¥	2.00E+02		na
4-methylphenol	NA	1.83E+01		БП	ξ	NA AN		na
nitrobenzene	NA	2.09E+00		na	¥	1.51E+04		na
isophorone	NA	6.59E+00		па	¥	2.83E+04		Па
2-nitrophenol	NA	NV		па	ž	NA AN		na
2,4-dimethylphenol	A A	7.30E+01		na	NA	NA		па
bis(2-chloroethoxy)methane	ΑA	N.		na	NA	NA		na
2,4-dichlorophenol	A A	1.10E+01		na	NA	3.00E+04		na
1,2,4-trichlorobenzene	N A	2.08E+02		na	ΑΑ	3.71E+04		na
naphthalene	5.50E-03	3.13E+00	1.76E-03	2	1.34E-01	7.86E+04	1.70E-06	2
4-chloroaniline	ΝΑ	1.46E+01		na	NA	3.00E+04		na
hexachlorobutadiene	Ä	8.03E-02		na	NA	3.21E+04		na
4-chloro-3-methylphenol	ΑA	N		na	NA	2.00E+04		na
2-methylnaphthalene	ΑĀ	7.30E+01		na	NA	2.00E+04		na
hexachlorocyclopentadiene	ΑĀ	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichlorophenol	ΑN	6.20E-01		na	NA	3.00E+04		na
2,4,5-trichlorophenol	Ϋ́Α	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	ΑN	2.92E+02		па	AA	6.00E+02		па
2-nitroaniline	ΑN	2.08E-01		na	NA	NA		па
Acenaphthylene	Ϋ́	N		na	NA	2.00E+02		na
dimethylphthalate	Ϋ́	3.65E+04		na	NA	1.50E+04		na
2,6-dinitrotoluene	ΑN	3.65E+00		na	NA	6.00E+02		па
acenaphthene	A A	2.19E+02		na	NA	1.25E+03		па
3-nitroaniline	AN	> <u>N</u>		na	NA	NA		па
2,4-dinitrophenol	ΑN	7.30E+00		na	NA	7.50E+03		ā
dibenzofuran	Ϋ́	1.46E+01		Па	NA	NA		БП
2,4-dinitrotoluene	Ϋ́	7.30E+00		na	NA	6.00E+02		na
4-nitrophenol	Ϋ́	2.92E+01		па	NA	3.00E+04		na
Fluorene	Ϋ́	1.46E+02		пa	ΑΝ	7.50E+04		na
4-chlorophenyl-phenylether	₹ V	> <u>N</u>		па	A A	NA		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	s, 5.56-mn	Tun DODI	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ATV	> 1?
diethylphthalate	NA	2.92E+03		na	AN	1.50E+04		na
4-nitroaniline	NA	NV		na	NA	9.00E+03		na
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	NA	5.00E+02		гa
n-nitrosodiphenylamine(1)	NA	1.28E+00		na	NA	ΝΑ		па
4-bromophenyl-phenylether	AN	NΛ		na	ΑN	NA		na
hexachlorobenzene	NA	3.91E-03		na	NA	7.50E+01		па
pentachlorophenol	NA	5.22E-02		na	ΑN	1.50E+03		па
phenanthrene	NA	NV		na	NA	2.00E+03		па
anthracene	ΑN	1.10E+03		na	ΑN	6.00E+03		па
di-n-butylphthalate	1.08E-01	3.65E+02	2.97E-04	no	2.63E+00	1.50E+04	1.76E-04	2
fluoranthene	NA	1.46E+02		na	NA	3.00E+01		па
pyrene	NA	1.10E+02		na	AN	1.50E+04		па
butylbenzylphthalate	NA	7.30E+02		na	NA A	5.00E+05		na
benzo(a)anthracene	NA	8.58E-03		na	NA	6.00E+02		٦a
chrysene	¥	8.58E-01		na	NA	2.00E+02		na
bis(2-ethylhexyl)phthalate	1.52E-01	4.47E-01	3.40E-01	no	8.62E+00	1.00E+04	8.62E-04	no
di-n-octylphthalate	NA	7.30E+01		na	NA	1.50E+05		na
benzo(b)fluoranthene	¥	8.58E-03		na	NA	NA		na
benzo(k)fluoranthene	Š	8.58E-02		na	NA	NA		na
benzo(a)pyrene	ΑΝ	2.02E-03		na	NA	7.50E+03		na
indeno(1,2,3-cd)pyrene	₹	8.58E-03		na	NA	NA		na
dibenz(a,h)anthracene	ΑN	8.58E-04		na	NA	3.00E+04		na
benzo(g,h,i)perylene	NA	NV		na	NA	3.00E+04		na
TO-13 (PAHs)								
naphthalene	4.33E-03	3.13E+00	1.39E-03	п	1.05E-01	7.86E+04	1.34E-06	ou
acenaphthylene	2.18E-04	NV		na	NA	2.00E+02		па
Acenaphthene	2.90E-05	2.19E+02	1.32E-07	on O	NA	1.25E+03		٦a
fluorene	1.09E-04	1.46E+02	7.44E-07	no	2.64E-03	7.50E+04	3.52E-08	no
phenanthrene	1.20E-04	N		па	2.91E-03	2.00E+03	1.45E-06	no
anthracene	2.26E-05	1.10E+03	2.07E-08	2	5.51E-04	6.00E+03	9.18E-08	no
fluoranthene	1.36E-04	1.46E+02	9.33E-07	2	3.31E-03	3.00E+01	1.10E-04	9
pyrene	3.72E-04	1.10E+02	3.39E-06	2	9.04E-03	1.50E+04	6.02E-07	2

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	, 5.56-mn I	Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
benzo(a)anthracene	3.07E-05	8.58E-03	3.58E-03	no	1.74E-03	6.00E+02	2.90E-06	ဥ
chrysene	3.59E-05	8.58E-01	4.19E-05	2	2.04E-03	2.00E+02	1.02E-05	2
benzo(b)fluoranthene	4.16E-05	8.58E-03	4.85E-03	2	5.90E-04	NA		na
benzo(k)fluoranthene	2.27E-05	8.58E-02	2.65E-04	2	3.22E-04	NA		na
Benzo(e)pyrene	1.13E-04	NV		na	6.89E-04	AN		па
benzo(a)pyrene	4.16E-05	2.02E-03	2.06E-02	no	2.36E-03	7.50E+03	3.15E-07	2
indeno(1,2,3-cd)pyrene	3.57E-05	8.58E-03	4.16E-03	no	5.07E-04	ΑN		na
dibenz(a,h)anthracene	4.89E-06	8.58E-04	5.70E-03	no	2.78E-04	3.00E+04	9.25E-09	2
benzo(g,h,i)perylene	3.56E-04	NV		na	8.66E-03	3.00E+04	2.89E-07	2
Dioxins and Furans								
2378-Tetrachlorodibenzo-p-dioxin	7.84E-11	4.17E-08	1.88E-03	5	4.45E-09	3.50E+00	1.27E-09	2
12378-Pentachlorodibenzo-p-dioxin	NA	NV		na	ΑN	2.50E+00		na
123478-Hexachlorodibenzo-p-dioxin	Ϋ́	NV		na	NA	ΑN		Па
123678-Hexachlorodibenzo-p-dioxin	Ϋ́	NV		na	NA	1.50E+01		na
123789-Hexachlorodibenzo-p-dioxin	ΝΑ	1.38E-06		na	NA	AN		na
1234678-Heptachlorodibenzo-p-dioxin	8.10E-10	NV		na	4.92E-09	NA		na
Octachlorodibenzo(p)dioxin	5.68E-09	N<		na	1.38E-07	1.50E+02	9.20E-10	on O
2378-Tetrachlorodibenzo-p-furan	Ϋ́	NV		na	NA	2.00E+00		na
12378-Pentachlorodibenzo-p-furan	Ϋ́Α	NV		na	NA	ΑN	· ·	na
23478-Pentachlorodibenzo-o-furan	Ϋ́	N		na	NA	7.50E-02		па
123478-Hexachlorodibenzo-p-furan	3.41E-11	N		na	8.29E-10	7.50E+00	1.11E-10	인
123678-Hexachlorodibenzo-p-furan	Ϋ́	N<		na	NA	2.50E+00		na
123789-Hexachlorodibenzo-p-furan	Ϋ́	NV		na	NA	AN		па
234678-Hexachlorodibenzo-p-furan	Ϋ́	NV		na	NA	1.50E+00	į	na
1234678-Heptachlorodibenzo-p-furan	1.83E-10	NV		na	1.11E-09	AN		БП
1234789-Heptachlorodibenzo-p-furan	NA	NV		na	NA	ΑN		БС
Octachlorodibenzofuran	9.37E-11	NV		na	2.28E-09	3.00E+02	7.59E-12	2
Energetics								
Nitrobenzene	Ϋ́	2.09E+00		na	NA	1.51E+04		na
2-Nitrotoluene	Ϋ́Z	3.65E+01		na	NA	NA		па
3-Nitrotoluene	Ϋ́	3.65E+01		па	NA	NA		па
4-Nitrotoluene	AN A	3.65E+01		na	ΑΝ	3.37E+04		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values - 100-meter location

		Cartridge	, 5.56-mr	n Tun DODI	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
Nitroglycerine	NA	4.47E-01		na	ΑN	AN		па
1,3-Dinitrobenzene	ΑΝ	3.65E-01		na	ΑA	3.00E+03		па
2,6-Dinitrotoluene	ΝΑ	3.65E+00		na	ΝA	6.00E+02		па
2,4-Dinitrotoluene	ΝΑ	7.30E+00		na	NA	6.00E+02		g
1,3,5-Trinitrobenzene	NA	1.10E+02		na	NA	3.00E+04		Б
2,4,6-Trinitrotoluene	ΑN	2.09E-01		na	NA	2.50E+04		na
RDX	NA	5.69E-02		na	NA	ΨN		na
4-Amino-2,6-Dinitrotoluene	ΑN	N		na	NA	VΝ		Б
2-Amino-2,6-Dinitrotoluene	ΝΑ	ΛN		na	NA	1.50E+04		па
Tetryl	ΝΑ	3.65E+01		na	NA	ΨN		БП
HMX	ΑN	1.83E+02		na	Ā	ΑN		па
Pentaerythritoltetranitrate	ΑN	N		na	NA	5.00E+01		па
Dibutyl Phthalate	ΑN	3.65E+02		na	NA	1.50E+04		na
Dioctyl Phthalate	NA	4.47E-01		na	NA	1.00E+04		па
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na
Footnotes:								
INA: Not applicable because compound was not detected	not detected.							

NA: Not applicable because compound was not detected.

na: Not available because health-based sceening value is not available or not applicable if compound was not detected.

NV: No value available.

Carronic: Chronic time-averaged concentration

HBSL: Chronic health-based screening level

Cacute: acute concentration

ATV: Acute toxicity value

Table D-2: Comparison of Modeled Air Concentrations with Health-Based Values: Total Petroleum Hydrocarbons - 100-meter location

	Cartrid	ge, 5.56-mm Tung DODIC	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	M16A2)
Compound	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Aliphatic:C<=8	Aliphatic:C>8	Aromatic:C<=8	Aromatic:C>8
Benzene	ΑN	NA	2.39E-01	NA
Heptane	3.07E-05	NA	ΑN	NA
Toluene	ΑΝ	NA	1.09E-02	NA
Styrene	ΑN	NA	۸A	3.87E-03
Propylene	4.10E-02	ΑN	AN	NA A
naphthalene	ΑΝ	ΑN	ΑN	5.50E-03
naphthalene	ΑN	ΑN	ΑN	4.33E-03
acenaphthylene	ΨN	AN	ΑN	2.18E-04
Acenaphthene	NA	NA	NA	2.90E-05
fluorene	ΝΑ	AN	ΑΝ	1.09E-04
phenanthrene	ΑN	AN	ΑN	1.20E-04
anthracene	ΑN	AN	ΑN	2.26E-05
fluoranthene	NA	NA	NA	1.36E-04
Total (µg/m³)	4.10E-02	00+300 [°] 0	2.50E-01	1.43E-02
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	2.14E-06	0.00E+00	5.99E-04	6.88E-05
>1?	no	no	no	no
ootnotes:				

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

C_{chronic} = chronic averaged air Concentration

HBSL = Health-Based Screening Level

6/4/2001

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	, 5.56-mn	Tur JODI	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
Permanent Gases								
Ammonia (NH3)	3.99E+00	1.04E+02	3.83E-02	2	2.43E+01	1.75E+04	1.39E-03	no
Carbon Dioxide (CO2)	1.56E+02	N		na	3.79E+03	5.40E+07	7.02E-05	20
Carbon Monoxide (CO)	2.92E+02	1.00E+04	2.92E-02	2	1.77E+03	2.30E+05	7.71E-03	2
Oxides of Nitrogen (as NO)	1.77E+00	1.00E+02	1.77E-02	2	4.31E+01	3.08E+04	1.40E-03	2
Sulfur Dioxide (SO2)	NA	8.00E+01		na	NA	7.89E+02		na
Acid Gases								
Hydrogen fluoride	Ϋ́	N		па	NA	1.60E+03		na
Hydrogen chloride	Αχ	2.08E+01		БE	N A	2.70E+03		na
Hydrogen bromide	Ϋ́	N		па	VΝ	9.93E+03		na
Nitric Acid	ΑN	Ž		na	NA	1.30E+03		na
Phosphoric acid	Ϋ́	1.04E+01		Ē	¥	3.00E+03		па
Sulfuric Acid	Αχ	N		na	NA	2.00E+03		na
Cyanide								
Particulate Cyanide	2.40E-03	7.30E+01	3.28E-05	2	5.83E-02	5.00E+03	1.17E-05	no
Hydrogen Cyanide	3.60E+00	3.13E+00	1.15E+00	yes	8.75E+01	5.17E+03	1.69E-02	no
Particulates								
Total Suspended Particulate	7.10E+00	5.00E+01	1.42E-01	2	4.32E+01	NA		na
PM10	7.02E+00	5.00E+01	1.40E-01	2	4.27E+01	NA		na
PM2.5	5.26E+00	1.50E+01	3.51E-01	2	3.20E+01	NA NA		na
Metals								
Aluminum	3.65E-02	3.65E+00	9.99E-03	2	8.87E-01	3.00E+04	2.96E-05	2
Antimony	2.60E-01	1.46E+00	1.78E-01	2	6.33E+00	1.50E+03	4.22E-03	2
Arsenic	NA	4.15E-04		na	NA	3.00E+01		na
Barium	9.00E-02	5.11E-01	1.76E-01	no	2.19E+00	1.50E+03	1.46E-03	no
Beryllium	Ϋ́	7.45E-04		na	NA	5.00E+00		na
Cadmium	ΑN	9.94E-04		na	NA	3.00E+01		na
Calcium	9.65E-02	NV		БП	2.35E+00	3.00E+04	7.83E-05	o
Chromium	AN	1.53E-04		na	WA	1.50E+03		na
Cobalt	NA	2.19E+02		па	¥	6.00E+01		na
Copper	2.57E+00	1.46E+02	1.76E-02	2	6.26E+01	3.00E+03	2.09E-02	2
Lead	1.12E+00	1.50E+00	7.44E-01	2	2.71E+01	1.50E+02	1.81E-01	2

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	e, 5.56-mr	n Tur DODI	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	(2)	
Compound	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
Magnesium	1.49E-02	NΛ		na	3.61E-01	3.00E+04	1.20E-05	92
Manganese	ΑN	5.11E-02		na	Ϋ́	3.00E+03		2
Nickel	ΑN	7.30E+01		na	¥.	3.00E+03		2 2
Selenium	2.17E-03	1.83E+01	1.19E-04	2	5.27E-02	6.00E+02	8 79E-05	2 2
Silver	NA	1.83E+01		na	Ϋ́Ν	3.00E+02		2 2
Thallium	AN	2.56E-01		na	¥N Y	3.00E+02		2 6
Vanadium	NA	2.56E+01		na	ΑN	1.50E+02		2 2
Zinc	3.53E-01	1.10E+03	3.22E-04	no	8.58E+00	3.00E+04	2.86E-04	2
TO-11 Carbonyls								
Formaldehyde	2.92E-02	1.39E-01	2.10E-01	2	4.15E-01	1.23E+03	3.37E-04	5
Acetaldehyde	1.84E-02	8.13E-01	2.26E-02	2	2.60E-01	1.80E+04	1.45E-05	2
Acetone	5.81E-02	3.65E+02	1.59E-04	2	1.41E+00	2.37E+06	5 96F-07	2
Acrolein	NA	2.08E-02		па	¥.	2.30E+02		2 6
Proprionaldehyde	NA	NV		na	A	7.50E+04		2 2
Crotonaldehyde	ΑN	3.30E-03		na	AN	5.72E+03		ed
Butyraldehyde	Ϋ́	NV		na	¥	7.38E+04		E
Benzaldehyde	Ϋ́	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	ΑN	2		na	ΑN	NA		na
Valeraldehyde	ΑΝ	<u>></u>		na	ΑN	NA		E C
o,m,p-Tolualdehyde	ΑN	>N		na	NA	ΑN		Бп
Hexaldehyde	₹Z	2		na	NA	NA		па
z,ɔ-Dimemyibenzaidenyde	Z Z	2		na	ΑN	NA		na
Propene	1 11E_02	NIV.		1	101			
Dichlorodifluoromethane	8 17E OF	1 00 - 100	7000	2	0.70E-UZ	NA		na
Chlorodifilioromothano	0.175	1.035+02	3.38E-U/	2	1.50E-03	1.48E+07	1.01E-10	no
Circl Collidor Olliettiane	۲ ۲	5.11E+04		БП	AN	4.41E+06		na
Freon 114	AN C	N/		g	ΝΑ	2.10E+07		па
Chloromethane	2.13 E- 06	1.07E+00	1.99E-06	2	1.21E-04	2.06E+05	5.86E-10	2
Vinyl Chloride	Y.	2.09E-01		па	NA	1.28E+04		па
1,3-Butadiene	8.25E-04	3.48E-03	2.37E-01	2	1.17E-02	2.20E+04	5.32E-07	2
Bromomethane	AN:	5.11E+00		па	NA	5.82E+04		na
Cnloroetnane	NA	2.16E+00		па	¥.	2.64E+06		БП

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	3, 5.56-mn	Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	G _{acute} / ATV	> 1?
Dichlorofluoromethane	ž	1.83E+02		па	ΑN	1.48E+07		na
Trichlorofluoromethane	2.66E-05	7.30E+02	3.64E-08	5	6.46E-04	2.81E+06	2.30E-10	ou
Pentane	ΑÑ	N N		na	NA	1.80E+06		na
Acrolein	6.57E-03	2.08E-02	3.16E-01	no	3.99E-02	2.30E+02	1.74E-04	no
1,1-Dichloroethene	ΑN	3.58E-02		na	NA	7.92E+04		na
Freon 113	Ϋ́	3.13E+04		na	ΑN	9.58E+06		na
Acetone	Ϋ́	3.65E+02		na	AN	2.37E+06		na
Methyl Iodide	Ą	2		na	NA	1.45E+05		na
Carbon Disulfide	₹	7.30E+02		na	¥	3.11E+04		na
Acetonitrile	2.35E-02	6.20E+01	3.80E-04	2	5.72E-01	1.01E+05	5.68E-06	9
3-Chloropropene	ΑΝ	1.04E+00		na	NA	9.39E+03		na
Methylene Chloride	4.21E-03	3.79E+00	1.11E-03	no	5.97E-02	6.96E+05	8.58E-08	no
tert-Butyl Alcohol	¥	≥		na	NA	4.55E+05		na
Acrylonitrile	3.32E-03	2.61E-02	1.27E-01	no	4.71E-02	2.17E+04	2.17E-06	2
trans-1,2-Dichloroethene	ΝA	7.30E+01		na	NA	1.11E+06		na
Methyl t-Butyl Ether	NA	3.13E+03		na	ΑN	4.32E+05		na
Hexane	ΝA	2.08E+02		na	NA	5.28E+05		na
1,1-Dichloroethane	AN	5.11E+02		na	¥	1.21E+06		na
Vinyl Acetate	NA	2.08E+02		na	ΑN	1.92E+04		na
cis-1,2-Dichloroethene	NA	3.65E+01		na	¥	5.54E+05		па
2-Butanone	1.87E-04	1.04E+03	1.79E-07	2	4.54E-03	8.85E+05	5.13E-09	on
Ethyl Acetate	3.77E-03	3.29E+03	1.15E-06	2	9.17E-02	1.44E+06	6.37E-08	2
Methyl Acrylate	NA	1.10E+02		па	NA	NA		na
Chloroform	NA	7.73E-02		па	NA	9.76E+03		па
1,1,1-Trichloroethane	AN	1.04E+03		na	NA	1.25E+06		na
Carbon Tetrachloride	ΑN	1.18E-01		na	NA	1.28E+05		na
1,2-Dichloroethane	6.04E-04	6.88E-02	8.78E-03	on O	3.43E-02	8.08E+03	4.24E-06	9
Benzene	3.93E-02	2.16E-01	1.82E-01	2	5.57E-01	1.56E+05	3.57E-06	ဥ
Isooctane (2,2,4-trimethylpentane)	AN	NV		п	ΝA	3.50E+05		па
Heptane	1.17E-05	NN		па	2.86E-04	1.80E+06	1.58E-10	2
Trichloroethane	NA	1.04E+03		па	NA	1.94E+06		па
Ethyl Acrylate	¥	1.40E-01		па	NA NA	6.14E+04		па

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	, 5.56-mr	Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	× 1?
1,2-Dichloropropane	ΝΑ	9.21E-02		na	ΑN	5.08E+05		na
Methyl Methacrylate	NA	7.30E+02		пa	Ϋ́	4.09E+05		na
Dibromomethane	NA	3.65E+01		na	ΑN	2.50E+05		na
1,4-Dioxane	NA	5.69E-01		na	NA	9.00E+04		na
Bromodichloromethane	NA	1.01E-01		na	NA	4.00E+03		na
cis-1,3-Dichloropropene	NA	NV		na	NA			na
4-Methyl-2-Pentanone	NA	7.30E+01		na	NA	3.07E+05		na
Toluene	4.18E-03	4.02E+02	1.04E-05	no	2.54E-02	1.88E+05	1.35E-07	OL
Octane	NA	NV		na	NA	NA		na
trans-1,3-Dichloropropene	ΝΑ	6.26E-01		na	NA	NA		na
Ethyl Methacrylate	ΝΑ	3.29E+02		na	NA	NA		na
1,1,2-Trichloroethane	NA	1.12E-01		na	NA	1.64E+05		na
Tetrachloroethene	ΑN	3.13E+00		na	NA	6.78E+05		na
2-Hexanone	ΑN	5.11E+00		na	NA	4.09E+04		na
Dibromochloromethane	Ϋ́	7.45E-02		БП	Ϋ́	6.00E+03		na
1,2-Dibromoethane	Ϋ́	8.24E-03		па	ΝΑ	1.54E+05		na
Chlorobenzene	Ϋ́	6.21E+01		па	NA	1.38E+05		na
1,1,1,2-Tetrachloroethane	ΑN	2.41E-01		na	NA	5.15E+04		na
Ethylbenzene	Ϋ́	1.06E+03		па	Ϋ́	5.43E+05		na
m&p-Xylene	Ϋ́	7.30E+02		na	NA	6.51E+05		na
o-Xylene	AN	7.30E+02		Б	NA NA	6.51E+05		na
Styrene	1.48E-03	1.04E+03	1.42E-06	2	9.02E-03	2.13E+05	4.24E-08	02
Bromoform	Ϋ́	1.61E+00		па	ΑΝ	6.20E+03		na
Cumene	Υ V	4.02E+02		па	NA	2.46E+05		na
1,1,2,2-Tetrachloroethane	Ϋ́	3.13E-02		па	ΑΝ	2.06E+04		na
1,2,3-Trichloropropane	Ϋ́	9.61E-04		na	NA	6.03E+04		na
Bromobenzene	ΑN	1.04E+01		па	NA	4.82E+04		na
4-Ethyltoluene	Ϋ́	N		па	ΑΝ	1.25E+05		na
1,3,5-Trimethylbenzene	Ϋ́	6.21E+00		٦a	NA	3.68E+05		na
Alpha Methyl Styrene	Ϋ́	2.56E+02		па	NA	NA		na
1,2,4-Trimethylbenzene	AN	6.21E+00		na	AN	1.80E+05		na
1,3-Dichlorobenzene	A A	3.29E+00		na	A A	3.61E+04		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	, 5.56-mn	n Tun DODI(n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
1,4-Dichlorobenzene	ΑN	2.85E-01		na	NA	6.61E+05		na
Benzyl Chloride	¥	3.68E-02		na	NA	5.20E+03		na
1,2-Dichlorobenzene	ΑN	2.09E+02		na	NA	3.01E+05		na
Hexachlorethane	¥	4.47E-01		na	NA	2.90E+04		na
1,2,4-Trichlorobenzene	Ϋ́	2.08E+02		na	NA	3.71E+04		na
Hexachlorobutadiene	ΝΑ	8.03E-02		na	NA	3.21E+04		na
Hydrocarbons								
Methane	1.60E+00	N		na	3.88E+01	3.30E+06	1.18E-05	no
Ethylene	9.01E-02	N		na	2.19E+00	4.60E+05	4.77E-06	no
Acetylene	1.20E-02	N		na	7.28E-02	NA		na
Ethane	4.59E-02	N		na	2.79E-01	NA		na
Propylene	1.57E-02	NN		na	9.54E-02	NA		na
Propane	Α̈́	N		na	NA	3.78E+06		na
Propyne (methyl acetylene)	ΑN	ΛN		na	ΑN	2.79E+06		na
Isobutane	ΑN	NV		na	NA	9.52E+05		na
1-Butene/Isobutylene (115-11-7)	NA	NV		na	NA	6.87E+06		na
1,3-Butadiene/butane	NA	3.48E-03		na	NA	2.20E+04		na
cis-butene	NA	NV		na	NA	1.72E+04		na
1-Butyne/trans-Butene	NA	NV		na	NA	1.72E+04		na
2-Butyne (crotonylene)	AN	NV		na	NA	NA		na
n-Pentane	NA	N		na	AA	1.80E+06		na
n-Hexane	A A	2.08E+02		na	¥	5.28E+05		na
SVOCs								
n-nitrosodimethylamine	NA	1.23E-04		na	A A	2.50E+03		na
bis(2-chloroethyl)ether	NA	5.69E-03		na	NA	5.85E+04		na
phenol	NA	2.19E+03		na	NA	3.85E+04		na
2-chlorophenol	NA	1.83E+01		na	NA	5.25E+03	,	na
1,3-Dichlorobenzene	NA	3.29E+00		na	ΑA	3.61E+04		na
1,4-dichlorobenzene	NA	2.85E-01		na	NA	6.61E+05		na
1,2-dichlorobenzene	NA	2.09E+02		na	¥	3.01E+05		na
benzyl alcohol	NA	1.10E+03		па	¥.	5.53E+04		na
bis(2-chloroisopropyl)ether	NA	1.79E-01		па	A A	6.99E+04		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	, 5.56-mm I	Tur	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chrontc} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
2-methylphenol	NA	1.83E+02		na	NA	NA		na
hexachloroethane	NA	4.47E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	NA	8.94E-04		na	ΑN	2.00E+02		па
4-methylphenol	NA	1.83E+01		na	NA	NA		па
nitrobenzene	AN	2.09E+00		na	NA	1.51E+04		na
isophorone	ΑN	6.59E+00		na	AN	2.83E+04		na
2-nitrophenol	ΑN	NV		na	NA	NA		na
2,4-dimethylphenol	ΝΑ	7.30E+01		na	NA	NA		na
bis(2-chloroethoxy)methane	Ϋ́	N		na	AN	NA		na
2,4-dichlorophenol	ΑN	1.10E+01		na	ΝA	3.00E+04		na
1,2,4-trichlorobenzene	ΑN	2.08E+02		na	Ϋ́	3.71E+04		na
naphthalene	2.11E-03	3.13E+00	6.73E-04	2	5.12E-02	7.86E+04	6.52E-07	ou
4-chloroaniline	Ϋ́	1.46E+01		na	NA	3.00E+04		na
hexachlorobutadiene	ΑN	8.03E-02		na	A A	3.21E+04		na
4-chloro-3-methylphenol	ΑN	N		na	Ϋ́	2.00E+04		na
2-methylnaphthalene	ΝΑ	7.30E+01		na	ΑN	2.00E+04		na
hexachlorocyclopentadiene	AN	7.30E-02		na	Ϋ́	2.23E+02		na
2,4,6-trichlorophenol	AN A	6.20E-01		па	ΝΑ	3.00E+04		na
2,4,5-trichlorophenol	Ϋ́	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	Ϋ́	2.92E+02		na	ΑN	6.00E+02		na
2-nitroaniline	ΑN	2.08E-01		na	۷A	NA		na
Acenaphthylene	ΑN	2		na	ΑN	2.00E+02		па
dimethylphthalate	A A	3.65E+04		па	NA	1.50E+04		na
2,6-dinitrotoluene	A A	3.65E+00		na	Ϋ́	6.00E+02		na
acenaphthene	A A	2.19E+02		na	NA	1.25E+03		na
3-nitroaniline	Υ V	NV		na	NA	NA		na
2,4-dinitrophenol	ΑN	7.30E+00		na	NA	7.50E+03		na
dibenzofuran	ΑN	1.46E+01		na	Ϋ́	NA		na
2,4-dinitrotoluene	Ϋ́	7.30E+00		па	ΑN	6.00E+02		na
4-nitrophenol	ΑN	2.92E+01		па	ΑN	3.00E+04		па
Fluorene	Ϋ́	1.46E+02		na	Ϋ́	7.50E+04		na
4-chlorophenyl-phenylether	AN	2		БП	NA	AN		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	e, 5.56-mn	Tun JODI	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 12
diethylphthalate	ΑN	2.92E+03		na	Ϋ́	1.50E+04		БП
4-nitroaniline	AN	ΛN		na	₹	9.00E+03		ā
4,6-dinitro-2-methylphenol	AN	3.65E-01		па	¥	5.00E+02		a
n-nitrosodiphenylamine(1)	AN	1.28E+00		na	¥	ΨŽ		ВП
4-bromophenyl-phenylether	AN	NV		na	NA	AN		Б
hexachlorobenzene	AN	3.91E-03		na	¥	7.50E+01		па
pentachlorophenol	NA	5.22E-02		na	¥ V	1.50E+03		па
phenanthrene	N A	NV		na	NA	2.00E+03		na
anthracene	Ϋ́	1.10E+03		na	NA	6.00E+03		па
di-n-butylphthalate	4.15E-02	3.65E+02	1.14E-04	00	1.01E+00	1.50E+04	6.73E-05	2
fluoranthene	Š	1.46E+02		na	NA	3.00E+01		ВП
pyrene	Ϋ́	1.10E+02		na	NA	1.50E+04		ā
butylbenzylphthalate	NA VA	7.30E+02		na	NA	5.00E+05		па
benzo(a)anthracene	Ϋ́	8.58E-03		na	NA	6.00E+02		па
chrysene	Š	8.58E-01		na	NA	2.00E+02		na
bis(2-ethylhexyl)phthalate	5.82E-02	4.47E-01	1.30E-01	no	3.30E+00	1.00E+04	3.30E-04	2
di-n-octylphthalate	Ϋ́	7.30E+01		na	NA	1.50E+05		na
benzo(b)fluoranthene	Ϋ́	8.58E-03		na	NA	NA		na
benzo(k)fluoranthene	ΑĀ	8.58E-02		па	NA	NA		na
benzo(a)pyrene	¥	2.02E-03		па	NA	7.50E+03		na
indeno(1,2,3-cd)pyrene	¥	8.58E-03		пa	NA	NA		na
dibenz(a,h)anthracene	Ϋ́	8.58E-04		na	NA	3.00E+04		na
benzo(g,h,i)perylene	ΑĀ	NV		na	NA	3.00E+04		na
TO-13 (PAHs)								
naphthalene	1.66E-03	3.13E+00	5.31E-04	ou	4.04E-02	7.86E+04	5.14E-07	2
acenaphthylene	8.37E-05	N<		na	NA	2.00E+02		na
Acenaphthene	1.11E-05	2.19E+02	5.08E-08	20	NA	1.25E+03		na
fluorene	4.16E-05	1.46E+02	2.85E-07	2	1.01E-03	7.50E+04	1.35E-08	2
phenanthrene	4.58E-05	N		па	1.11E-03	2.00E+03	5.57E-07	OU
anthracene	8.68E-06	1.10E+03	7.92E-09	2	2.11E-04	6.00E+03	3.52E-08	OU
fluoranthene	5.22E-05	1.46E+02	3.57E-07	2	1.27E-03	3.00E+01	4.23E-05	no
pyrene	1.42E-04	1.10E+02	1.30E-06	2	3.46E-03	1.50E+04	2.31E-07	00

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	3, 5.56-mm	Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
benzo(a)anthracene	1.18E-05	8.58E-03	1.37E-03	2	6.67E-04	6.00E+02	1.11E-06	2
chrysene	1.38E-05	8.58E-01	1.60E-05	2	7.80E-04	2.00E+02	3.90E-06	2
benzo(b)fluoranthene	1.59E-05	8.58E-03	1.86E-03	2	2.26E-04	ΝΑ		па
benzo(k)fluoranthene	8.71E-06	8.58E-02	1.02E-04	2	1.24E-04	ΑN		na
Benzo(e)pyrene	4.34E-05	NV		na	2.64E-04	NA		па
benzo(a)pyrene	1.59E-05	2.02E-03	7.90E-03	2	9.05E-04	7.50E+03	1.21E-07	2
indeno(1,2,3-cd)pyrene	1.37E-05	8.58E-03	1.60E-03	ou	1.94E-04	AN		па
dibenz(a,h)anthracene	1.87E-06	8.58E-04	2.18E-03	no	1.06E-04	3.00E+04	3.54E-09	OL OL
benzo(g,h,i)perylene	1.36E-04	NV		na	3.32E-03	3.00E+04	1.11E-07	OU
Dioxins and Furans								
2378-Tetrachlorodibenzo-p-dioxin	3.01E-11	4.17E-08	7.20E-04	no	1.71E-09	3.50E+00	4.87E-10	92
12378-Pentachlorodibenzo-p-dioxin	NA	NV		na	NA	2.50E+00		na
123478-Hexachlorodibenzo-p-dioxin	NA	NV		na	NA	NA		na
123678-Hexachlorodibenzo-p-dioxin	NA	NV		na	NA	1.50E+01		na
123789-Hexachlorodibenzo-p-dioxin	Ϋ́	1.38E-06		na	NA	NA		na
1234678-Heptachlorodibenzo-p-dioxin	3.10E-10	NN		na	1.89E-09	NA		na
Octachlorodibenzo(p)dioxin	2.18E-09	NV		na	5.29E-08	1.50E+02	3.53E-10	인
2378-Tetrachlorodibenzo-p-furan	NA	NV		na	NA	2.00E+00		na
12378-Pentachlorodibenzo-p-furan	A A	N<		na	NA	NA		na
23478-Pentachlorodibenzo-o-furan	A A	2		na	ΑN	7.50E-02		na
123478-Hexachlorodibenzo-p-furan	1.31E-11	>N		па	3.18E-10	7.50E+00	4.24E-11	no
123678-Hexachlorodibenzo-p-furan	ΑN	N		Па	NA	2.50E+00		na
123789-Hexachlorodibenzo-p-furan	ΑN	N		па	NA	NA		na
234678-Hexachlorodibenzo-p-furan	NA	NV		na	NA	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	7.01E-11	NV		na	4.26E-10	NA		na
1234789-Heptachlorodibenzo-p-furan	AN	ΛN		na	NA	NA AN		na
Octachlorodibenzofuran	3.59E-11	NV		na	8.73E-10	3.00E+02	2.91E-12	2
Energetics								
Nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
2-Nitrotoluene	ΑN	3.65E+01		na	NA	NA		na
3-Nitrotoluene	Ϋ́	3.65E+01		na	ΝΑ	NA		na
4-Nitrotoluene	ΑN	3.65E+01		па	A A	3.37E+04		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values - 200-meter location

		Cartridge	, 5.56-mn I	n Tun JODI(n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
Nitroglycerine	NA	4.47E-01		па	ΑĀ	ΑN		na
1,3-Dinitrobenzene	ΑN	3.65E-01		na	¥	3.00E+03		na
2,6-Dinitrotoluene	ΝΑ	3.65E+00		na	¥	6.00E+02		na
2,4-Dinitrotoluene	ΝΑ	7.30E+00		na	¥	6.00E+02		na
1,3,5-Trinitrobenzene	ΑN	1.10E+02		na	¥	3.00E+04		na
2,4,6-Trinitrotoluene	ΑN	2.09E-01		na	Ϋ́	2.50E+04		na
RDX	NA	5.69E-02		na	ΑN	ΑN		na
4-Amino-2,6-Dinitrotoluene	NA	NV		na	NA	AN		na
2-Amino-2,6-Dinitrotoluene	NA	N		na	NA	1.50E+04		na
Tetryl	NA	3.65E+01		na	Ν	ΑN		na
HMX	AN	1.83E+02		na	¥	AN		na
Pentaerythritoltetranitrate	NA	N/		na	ΑĀ	5.00E+01		na
Dibutyl Phthalate	NA	3.65E+02		na	Ν	1.50E+04		na
Dioctyl Phthalate	NA	4.47E-01		na	ΑN	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	ΑN	3.00E+04		na
.0000								

Footnotes:

NA: Not applicable because compound was not detected.

na: Not available because health-based sceening value is not available or not applicable if compound was not detected.

NV: No value available.

Cchronic: Chronic time-averaged concentration

HBSL: Chronic health-based screening level

Cacute: acute concentration

ATV: Acute toxicity value

Table D-4: Comparison of Modeled Air Concentrations with Health-Based Values: Total Petroleum Hydrocarbons - 200-meter location

	Cartrid	ge, 5.56-mm Tung DODIC	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	M16A2)
Compound	С _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Aliphatic:C<=8	Aliphatic:C>8	Aromatic:C<=8	Aromatic:C>8
Benzene	NA	NA	9.16E-02	NA
Heptane	1.17E-05	AN	AN	NA
Toluene	NA	NA	4.18E-03	NA
Styrene	NA	NA	AN	1.48E-03
Propylene	1.57E-02	AN	AN	ΝΑ
naphthalene	NA	NA	NA	2.11E-03
naphthalene	NA	NA	NA	1.66E-03
acenaphthylene	NA	AN	ΑΝ	8.37E-05
Acenaphthene	NA	NA	NA	1.11E-05
fluorene	NA	NA	NA	4.16E-05
phenanthrene	NA	AN	ΑΝ	4.58E-05
anthracene	NA	NA	ΑN	8.68E-06
fluoranthene	NA	NA	NA	5.22E-05
Total (µg/m³)	1.57E-02	0.00E+00	9.58E-02	5.49E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	8.19E-07	0.00E+00	2.30E-04	2.63E-05
>19	no	no	no	no
Footnotes:				
>1? = Is the ratio greater than one?				
NA = Not Applicable because compound was not detected				
C _{chronic} = chronic averaged air Concentration				
HBSL = Health-Based Screening Level				

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

		Cartridge	e, 5.56-mn	Tur	igsten Ba	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2)	2)	
					DODIC: A059			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 1?
Permanent Gases								
Ammonia (NH3)	2.17E+00	1.04E+02	2.08E-02	ou	1.32E+01	1.75E+04	7.55E-04	2
Carbon Dioxide (CO2)	8.49E+01	N		па	2.07E+03	5.40E+07	3.82E-05	2
Carbon Monoxide (CO)	1.59E+02	1.00E+04	1.59E-02	2	9.66E+02	2.30E+05	4.20E-03	2
Oxides of Nitrogen (as NO)	9.65E-01	1.00E+02	9.65E-03	2	2.35E+01	3.08E+04	7.64E-04	2
Sulfur Dioxide (SO2)	Ą	8.00E+01		ā	¥	7.89E+02		па
Acid Gases								
Hydrogen fluoride	ΝΑ	NN		па	¥	1.60E+03		па
Hydrogen chloride	AN	2.08E+01		Б	ΝA	2.70E+03		na
Hydrogen bromide	NA	NΛ		na	NA	9.93E+03		na
Nitric Acid	ΝΑ	N		па	Ą	1.30E+03		па
Phosphoric acid	ΑΝ	1.04E+01		па	Ą	3.00E+03		na
Sulfuric Acid	ΑΝ	N		па	ΑĀ	2.00E+03		na
Cyanide								
Particulate Cyanide	1.30E-03	7.30E+01	1.79E-05	2	3.17E-02	5.00E+03	6.35E-06	2
Hydrogen Cyanide	1.96E+00	3.13E+00	6.27E-01	2	4.77E+01	5.17E+03	9.22E-03	2
Particulates								
Total Suspended Particulate	3.87E+00	5.00E+01	7.74E-02	on O	2.35E+01	NA		na
PM10	3.82E+00	5.00E+01	7.64E-02	ou	2.32E+01	NA		па
PM2.5	2.87E+00	1.50E+01	1.91E-01	2	1.74E+01	NA		na
Metals								
Aluminum	1.99E-02	3.65E+00	5.44E-03	2	4.83E-01	3.00E+04	1.61E-05	no
Antimony	1.42E-01	1.46E+00	9.72E-02	2	3.45E+00	1.50E+03	2.30E-03	no
Arsenic	NA	4.15E-04		na	NA	3.00E+01		na
Barium	4.90E-02	5.11E-01	9.60E-02	2	1.19E+00	1.50E+03	7.95E-04	00
Beryllium	ΑΝ	7.45E-04		па	NA	5.00E+00		na
Cadmium	Ϋ́	9.94E-04		na	ΑA	3.00E+01		na
Calcium	5.26E-02	N		Бa	1.28E+00	3.00E+04	4.26E-05	uo
Chromium	A V	1.53E-04		g	NA	1.50E+03		na
Cobalt	Ϋ́	2.19E+02		В	¥	6.00E+01		na
Copper	1.40E+00	1.46E+02	9.61E-03	2	3.41E+01	3.00E+03	1.14E-02	ou
Lead	6.08E-01	1.50E+00	4.05E-01	2	1.48E+01	1.50E+02	9.85E-02	no

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

		Cartridge	s, 5.56-mn	Tun	gsten Ba	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2)	2)	
					DODIC: A059			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	G _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	× 13
Magnesium	8.09E-03	NV		na	1.97E-01	3.00E+04	6.56E-06	5
Manganese	ΝΑ	5.11E-02		na	NA	3.00E+03		па
Nickel	NA	7.30E+01		na	NA	3.00E+03		na
Selenium	1.18E-03	1.83E+01	6.47E-05	OD.	2.87E-02	6.00E+02	4.78E-05	2
Silver	NA	1.83E+01		na	NA	3.00E+02		na
Thallium	NA	2.56E-01		na	NA	3.00E+02		БП
Vanadium	NA	2.56E+01		na	NA	1.50E+02		na
Zinc	1.92E-01	1.10E+03	1.75E-04	no	4.67E+00	3.00E+04	1.56E-04	2
TO-11 Carbonyls								
Formaldehyde	1.59E-02	1.39E-01	1.14E-01	no	2.26E-01	1.23E+03	1.84E-04	2
Acetaldehyde	1.00E-02	8.13E-01	1.23E-02	no	1.42E-01	1.80E+04	7.88E-06	ဥ
Acetone	3.16E-02	3.65E+02	8.67E-05	no	7.69E-01	2.37E+06	3.25E-07	2
Acrolein	Ϋ́	2.08E-02		na	NA	2.30E+02		Па
Proprionaldehyde	Ą	N		na	NA	7.50E+04		na
Crotonaldehyde	ΑN	3.30E-03		na	Ϋ́	5.72E+03		na
Butyraldehyde	Ϋ́			na	ΝΑ	7.38E+04		na
Benzaldehyde	Ϋ́	3.65E+02		na	ΑN	1.50E+04		na
Isovaleraldehyde	Υ Υ	≥N		na	NA	NA		na
Valeraldehyde	Ϋ́	N		na	ΑΑ	NA		na
o,m,p-Tolualdehyde	ΑN	2		na	Ϋ́	NA		na
Hexaldehyde	ΑN	≥ N		na	NA	NA		na
2,5-Dimethylbenzaldehyde	ΑN	N		na	NA	NA		na
VOCs								
Propene	6.05E-03	NV		na	3.68E-02	NA		na
Dichlorodifluoromethane	3.36E-05	1.83E+02	1.84E-07	no	8.17E-04	1.48E+07	5.51E-11	2
Chlorodifluoromethane	NA	5.11E+04		na	NA	4.41E+06		na
Freon 114	AA	NΛ		na	NA	2.10E+07		Па
Chloromethane	1.16E-06	1.07E+00	1.09E-06	2	6.58E-05	2.06E+05	3.19E-10	ou
Vinyl Chloride	ΑN	2.09E-01		па	NA	1.28E+04		na
1,3-Butadiene	4.50E-04	3.48E-03	1.29E-01	2	6.38E-03	2.20E+04	2.90E-07	OU
Bromomethane	ΑN	5.11E+00		па	ΝΑ	5.82E+04		na
Chloroethane	N A A	2.16E+00		па	A A	2.64E+06		na

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

·		Cartridge	e, 5.56-mn	Tur	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	G _{acute} / ATV	> 1?
Dichlorofluoromethane	AN	1.83E+02		na	ΑN	1.48E+07		Па
Trichlorofluoromethane	1.45E-05	7.30E+02	1.98E-08	2	3.52E-04	2.81E+06	1.26E-10	2
Pentane	NA	NV		na	ΝA	1.80E+06		па
Acrolein	3.58E-03	2.08E-02	1.72E-01	no	2.17E-02	2.30E+02	9.45E-05	ဥ
1,1-Dichloroethene	NA	3.58E-02		na	¥	7.92E+04		БП
Freon 113	NA	3.13E+04		na	NA	9.58E+06		na
Acetone	NA	3.65E+02		na	N.	2.37E+06		па
Methyl Iodide	NA	NV		na	NA	1.45E+05		na
Carbon Disulfide	NA	7.30E+02		na	NA	3.11E+04		na
Acetonitrile	1.28E-02	6.20E+01	2.07E-04	no	3.12E-01	1.01E+05	3.09E-06	no
3-Chloropropene	Ϋ́	1.04E+00		na	NA	9.39E+03		na
Methylene Chloride	2.29E-03	3.79E+00	6.04E-04	no	3.25E-02	6.96E+05	4.67E-08	2
tert-Butyl Alcohol	ΑΝ	NV		na	NA	4.55E+05		na
Acrylonitrile	1.81E-03	2.61E-02	6.93E-02	n0	2.57E-02	2.17E+04	1.18E-06	OL
trans-1,2-Dichloroethene	Ą	7.30E+01		na	NA	1.11E+06		na
Methyl t-Butyl Ether	Ą	3.13E+03		na	NA	4.32E+05		na
Hexane	Ą	2.08E+02		па	¥	5.28E+05		na
1,1-Dichloroethane	Ą	5.11E+02		na	NA	1.21E+06		na
Vinyl Acetate	¥	2.08E+02		па	ΑN	1.92E+04		na
cis-1,2-Dichloroethene	Ą	3.65E+01		na	¥	5.54E+05		na
2-Butanone	1.02E-04	1.04E+03	9.75E-08	5	2.47E-03	8.85E+05	2.79E-09	no
Ethyl Acetate	2.05E-03	3.29E+03	6.25E-07	2	4.99E-02	1.44E+06	3.47E-08	OU
Methyl Acrylate	Ą	1.10E+02		na	ΑN	NA		na
Chloroform	Ą	7.73E-02		na	NA	9.76E+03		na
1,1,1-Trichloroethane	NA	1.04E+03		na	NA	1.25E+06		na
Carbon Tetrachloride	ΑN	1.18E-01		па	NA	1.28E+05		na
1,2-Dichloroethane	3.29E-04	6.88E-02	4.78E-03	2	1.87E-02	8.08E+03	2.31E-06	no
Benzene	2.14E-02	2.16E-01	9.91E-02	2	3.03E-01	1.56E+05	1.94E-06	no
Isooctane (2,2,4-trimethylpentane)	ΑĀ	N		па	Ϋ́	3.50E+05		na
Heptane	6.40E-06	≥		па	1.56E-04	1.80E+06	8.63E-11	no
Trichloroethane	A A	1.04E+03		па	ΑN	1.94E+06		na
Ethyl Acrylate	A A	1.40E-01		g	ΑN	6.14E+04		Па

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

		Cartridge	, 5.56-mr [Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
1,2-Dichloropropane	NA	9.21E-02		na	ΑĀ	5.08E+05		na
Methyl Methacrylate	NA	7.30E+02		na	NA	4.09E+05		na
Dibromomethane	AN	3.65E+01		na	AN	2.50E+05		na
1,4-Dioxane	AN	5.69E-01		пa	Ϋ́	9.00E+04		na
Bromodichloromethane	NA	1.01E-01		na	Ϋ́	4.00E+03		na
cis-1,3-Dichloropropene	NA	NV		na	Ϋ́			na
4-Methyl-2-Pentanone	NA	7.30E+01		na	ΝΑ	3.07E+05		na
Toluene	2.27E-03	4.02E+02	5.66E-06	20	1.38E-02	1.88E+05	7.38E-08	2
Octane	ΑN	NV		na	NA	NA	i i i i i i i i i i i i i i i i i i i	na
trans-1,3-Dichloropropene	Ϋ́	6.26E-01		na	NA	NA		na
Ethyl Methacrylate	A V	3.29E+02		na	NA	NA		па
1,1,2-Trichloroethane	ΑN	1.12E-01		na	NA	1.64E+05		na
Tetrachloroethene	AN	3.13E+00		na	NA	6.78E+05		вп
2-Hexanone	ΑΝ	5.11E+00		na	NA	4.09E+04		па
Dibromochloromethane	ΑN	7.45E-02		па	NA	6.00E+03		па
1,2-Dibromoethane	Ϋ́	8.24E-03		па	NA	1.54E+05		na
Chlorobenzene	ΑN	6.21E+01		na	NA	1.38E+05		na
1,1,1,2-Tetrachloroethane	NA	2.41E-01		na	NA	5.15E+04		па
Ethylbenzene	Ϋ́	1.06E+03		na	NA	5.43E+05		па
m&p-Xylene	ΑN	7.30E+02		na	ΑΝ	6.51E+05		na
o-Xylene	ΑĀ	7.30E+02		гa	NA	6.51E+05		na
Styrene	8.08E-04	1.04E+03	7.74E-07	2	4.91E-03	2.13E+05	2.31E-08	no
Bromoform	ΑN	1.61E+00		Б	ΑN	6.20E+03		па
Cumene	Ϋ́	4.02E+02		na	NA	2.46E+05		na
1,1,2,2-Tetrachloroethane	ΑN	3.13E-02		na	NA	2.06E+04		па
1,2,3-Trichloropropane	ΑΝ	9.61E-04		na	NA	6.03E+04		na
Bromobenzene	Ϋ́	1.04E+01		na	NA	4.82E+04		na
4-Ethyltoluene	Ϋ́	N<		na	¥	1.25E+05		na
1,3,5-Trimethylbenzene	Ϋ́	6.21E+00		na	ΑN	3.68E+05		na
Alpha Methyl Styrene	ΑN	2.56E+02		пa	ΑΝ	A'N		na
1,2,4-Trimethylbenzene	ΑΝ	6.21E+00		па	¥	1.80E+05		па
1,3-Dichlorobenzene	AN	3.29E+00		na	Ϋ́	3.61E+04		na

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

		Cartridge	, 5.56-mn	n Tun DODI	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
1,4-Dichlorobenzene	۸N	2.85E-01		eu	ΝΑ	6.61E+05		na
Benzyl Chloride	NA	3.68E-02		na	NA	5.20E+03		na
1,2-Dichlorobenzene	AN	2.09E+02		na	NA	3.01E+05		na
Hexachlorethane	ΑΝ	4.47E-01		na	ΑĀ	2.90E+04		na
1,2,4-Trichlorobenzene	ΑN	2.08E+02		na	Ϋ́	3.71E+04		па
Hexachlorobutadiene	Ϋ́	8.03E-02		na	Ϋ́	3.21E+04		па
Hydrocarbons								
Methane	8.70E-01	N N		na	2.12E+01	3.30E+06	6.41E-06	ဥ
Ethylene	4.91E-02	N		na	1.19E+00	4.60E+05	2.60E-06	ဥ
Acetylene	6.52E-03	λN		na	3.96E-02	NA		Б
Ethane	2.50E-02	NV		na	1.52E-01	NA		na
Propylene	8.55E-03	ΛN		na	5.20E-02	NA		па
Propane	NA	NV		na	NA	3.78E+06		па
Propyne (methyl acetylene)	NA	NV		na	NA	2.79E+06		na
Isobutane	ΑN	NV		na	ΝA	9.52E+05		na
1-Butene/Isobutylene (115-11-7)	ΑN	NV		na	ΑN	6.87E+06		na
1,3-Butadiene/butane	ΑN	3.48E-03		na	ΑĀ	2.20E+04		na
cis-butene	AN	NV		na	NA	1.72E+04		na
1-Butyne/frans-Butene	ΑΝ	NV		na	NA	1.72E+04		na
2-Butyne (crotonylene)	Ϋ́	NV		na	ΑA	NA		na
n-Pentane	Ϋ́	N		na	Ϋ́	1.80E+06		na
n-Hexane	NA	2.08E+02		na	NA	5.28E+05		na
SVOCs								
n-nitrosodimethylamine	AA	1.23E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	AA	5.69E-03		na	NA	5.85E+04		na
phenol	A'N	2.19E+03		na	ΑN	3.85E+04		na
2-chlorophenol	Š	1.83E+01		na	¥	5.25E+03		na
1,3-Dichlorobenzene	Ϋ́	3.29E+00		na	ΑN	3.61E+04		na
1,4-dichlorobenzene	Ϋ́	2.85E-01		na	¥	6.61E+05		na
1,2-dichlorobenzene	Ϋ́	2.09E+02		na	ΨV	3.01E+05		na
benzyl alcohol	Ϋ́	1.10E+03		na	¥	5.53E+04		na
bis(2-chloroisopropyl)ether	¥	1.79E-01		na	AN	6.99E+04		na

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

		Cartridge	e, 5.56-mn	Tun	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 1 >
2-methylphenol	NA	1.83E+02		na	ΑN	ĄN		Па
hexachloroethane	NA	4.47E-01		па	ΑN	2.90E+04		Па
n-nitroso-di-n-propylamine	NA	8.94E-04		na	ΑN	2.00E+02		na
4-methylphenol	NA	1.83E+01		na	NA	ΝΑ		na
nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
isophorone	NA	6.59E+00		na	NA	2.83E+04		па
2-nitrophenol	NA	NV		na	NA	NA		na
2,4-dimethylphenol	NA	7.30E+01		na	NA	NA		na
bis(2-chloroethoxy)methane	NA	NV		na	NA	NA		na
2,4-dichlorophenol	AA	1.10E+01		na	NA	3.00E+04		na
1,2,4-trichlorobenzene	NA NA	2.08E+02		na	NA	3.71E+04		na
naphthalene	1.15E-03	3.13E+00	3.67E-04	ou	2.79E-02	7.86E+04	3.55E-07	2
4-chloroaniline	NA	1.46E+01		na	NA	3.00E+04		па
hexachlorobutadiene	NA	8.03E-02		na	NA	3.21E+04		na
4-chloro-3-methylphenol	NA	N		na	NA	2.00E+04		na
2-methylnaphthalene	ΑN	7.30E+01		na	ΑN	2.00E+04		na
hexachlorocyclopentadiene	ΑN	7.30E-02		па	NA	2.23E+02		na
2,4,6-trichlorophenol	NA	6.20E-01		na	NA	3.00E+04		na
2,4,5-trichlorophenol	NA	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	NA NA	2.92E+02		na	NA	6.00E+02		na
2-nitroaniline	NA	2.08E-01		na	NA	NA		na
Acenaphthylene	ΑN	N		na	NA	2.00E+02		na
dimethylphthalate	NA	3.65E+04		na	NA	1.50E+04		na
2,6-dinitrotoluene	ΑN	3.65E+00		na	NA	6.00E+02		na
acenaphthene	NA	2.19E+02		na	NA	1.25E+03		па
3-nitroaniline	ΑN	N		па	NA	NA		na
2,4-dinitrophenol	Ϋ́	7.30E+00		na	ΝΑ	7.50E+03		na
dibenzofuran	Ϋ́	1.46E+01		na	ΑN	NA		na
2,4-dinitrotoluene	ΑN	7.30E+00		Па	ΑΝ	6.00E+02		na
4-nitrophenol	NA	2.92E+01		па	ΝΑ	3.00E+04		na
Fluorene	Α	1.46E+02		na	NA	7.50E+04		na
4-chlorophenyl-phenylether	NA	N		па	A A	NA		na

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

C chronic (µg/m³) e		2	000	DODIC: A059	DODIC: A059	-	
NA NA 1.1 NA NA 3.3 NA NA 1.1 NA NA 8.8 NA NA NA NA 8.8 NA NA NA 8.8 NA NA NA NA NA 8.8 NA NA NA NA NA 8.8 NA N	Scre	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
NA NA 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3.			na	NA	1.50E+04		na
NA NA 1. NA NA 8. NA NA NA NA NA 8. NA N			na	NA	9.00E+03		na
NA N			na	NA	5.00E+02		na
NA NA S S S S S S S S S S S S S S S S S			na	NA	NA		па
NA NA 5.3 NA NA 1.1 NA NA 1.1 NA NA 1.1 NA NA 8.8 NA NA NA 8.8 NA NA 8.8 NA NA NA NA NA 8.8 NA N			na	NA	NA		na
NA NA 1. NA NA 1. NA NA 1. NA NA 7. NA NA 8 3.17E-02 4 NA NA 8 NA NA SE-05 2.50E-05 2.50E-05 2.50E-05	3		na	NA	7.50E+01		na
NA NA 1. NA NA 1. NA NA 1. NA NA 8. NA NA NA 8. S.50E-05 C.27E-05 C.2	5.		na	NA	1.50E+03		па
NA 1. NA 7. NA NA 8. SOE-05 2.27E-05 2.27E-05 2.27E-05 4.73E-06 4.73E-06			na	NA	2.00E+03		na
NA 1.1 NA 7.7 NA 8 NA 8.4 NA 8 8			na	N A	6.00E+03		na
NA NA 1. NA NA 7. NA NA 8 3.17E-02 4 NA NA 8 NA NA NA NA 8 NA N		6.19E-05	2	5.50E-01	1.50E+04	3.67E-05	no
NA N			na	NA	3.00E+01		na
NA N			na	NA	1.50E+04		па
NA NA 8 NA 7. NA NA 8 NA 2 NA 2 NA 2 NA 8 NA 2 NA 8 NA 8 NA 8 NA 2 1.56E-05 6.05E-05 6.05E-05 7.27E-05 7.27E-05 7.27E-05			na	NA	5.00E+05		na
NA 8 NA 7. NA 8 NA 8 NA 2 NA 8 NA 8 NA 8 NA 8 NA 8 0.05E-04 3 4.56E-05 2.27E-05 11			na	ΑĀ	6.00E+02		na
NA NA 8 NA			na	NA	2.00E+02		na
NA NA 8 NA 8 NA 8 NA 8 NA 8 NA 8 1.55E-04 3. 2.27E-05 1. 2.50E-05 1.	17E-02	7.09E-02	2	1.80E+00	1.00E+04	1.80E-04	ဥ
NA 8 NA 8 NA 8 NA 8 NA 8 NA 8 NA 8 0.05E-04 3 4.56E-05 6.05E-05 6.05E-05 7.27E-05 7.37E-06			Ē	ΑN	1.50E+05		na
NA NA 2 NA 2 NA NA 8 NA NA 8 0.05E-04 3 4.56E-05 2 6.05E-06 2 2.27E-05 1 2.20E-05 1			В	ΑΝ	NA		па
NA 8 NA 8 NA 8 NA 8 9.05E-04 3 4.56E-05 6.05E-06 2.27E-05 1.250E-05 4.73E-06			Б	ΑN	NA		па
NA 8 NA 8 NA 8 9.05E-04 3. 4.56E-05 6.05E-06 2. 2.27E-05 1. 2.50E-05 1.			g	ΑN	7.50E+03		па
NA N	8		na	≨	NA AA		na
NA 9.05E-04 4.56E-05 6.05E-06 2.27E-05 4.73E-06	8		g	¥	3.00E+04		na
9.05E-04 3 4.56E-05 6.05E-06 2 2.27E-05 1 2.50E-05 4.73E-06 1			Б	₹	3.00E+04		na
9.05E-04 3. 4.56E-05 6.05E-06 2. 2.27E-05 1. 2.50E-05 4.73E-06 1.							
4.56E-05 6.05E-06 2.27E-05 1.50E-05 4.73E-06	3.1	2.89E-04	2	2.20E-02	7.86E+04	2.80E-07	2
6.05E-06 2.27E-05 1.2.50E-05 4.73E-06 1.2.50E-05 1.2.50			na	¥	2.00E+02		na
2.27E-05 2.50E-05 4.73E-06	6.05E-06 2.19E+02	2.76E-08	5	¥	1.25E+03		na
2.50E-05		1.55E-07	2	5.51E-04	7.50E+04	7.35E-09	2
4.73E-06			na	6.07E-04	2.00E+03	3.03E-07	2
TO FLOOR		4.32E-09	5	1.15E-04	6.00E+03	1.92E-08	2
		1.95E-07	5	6.91E-04	3.00E+01	2.30E-05	2
pyrene 7.75E-05 1.10E+02	7.75E-05 1.10E+02	7.08E-07	2	1.89E-03	1.50E+04	1.26E-07	9

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

		Cartridge	s, 5.56-mn	Tun DOD	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	(2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 13
benzo(a)anthracene	6.40E-06	8.58E-03	7.47E-04	50	3.63E-04	6.00E+02	6.06E-07	2
chrysene	7.49E-06	8.58E-01	8.73E-06	ou	4.25E-04	2.00E+02	2.13E-06	2
benzo(b)fluoranthene	8.68E-06	8.58E-03	1.01E-03	2	1.23E-04	NA NA		2 2
benzo(k)fluoranthene	4.74E-06	8.58E-02	5.53E-05	2	6.73E-05	NA AA		2 2
Benzo(e)pyrene	2.36E-05	NV		па	1.44E-04	NA V		2 2
benzo(a)pyrene	8.68E-06	2.02E-03	4.30E-03	2	4.93E-04	7.50E+03	6.57E-08	2
indeno(1,2,3-cd)pyrene	7.45E-06	8.58E-03	8.69E-04	2	1.06E-04	ΑN		2 2
dibenz(a,h)anthracene	1.02E-06	8.58E-04	1.19E-03	OU	5.79E-05	3.00E+04	1.93E-09	2
benzo(g,h,i)perylene	7.43E-05	NV		na	1.81E-03	3.00E+04	6.03E-08	2
Dioxins and Furans								
2378-Tetrachlorodibenzo-p-dioxin	1.64E-11	4.17E-08	3.92E-04	2	9.29E-10	3.50E+00	2.65E-10	2
12378-Pentachlorodibenzo-p-dioxin	NA	N		na	ΑX	2.50E+00		2 6
123478-Hexachlorodibenzo-p-dioxin	NA	N/		g	ΑN	NA		2 6
123678-Hexachlorodibenzo-p-dioxin	Ā	NV		na	AA	1.50E+01		na Da
123789-Hexachlorodibenzo-p-dioxin	NA	1.38E-06		na	¥	AN		Па
1234678-Heptachlorodibenzo-p-dioxin	1.69E-10	N		na	1.03E-09	ΝΑ		па
Octachlorodibenzo(p)dioxin	1.18E-09	NV		na	2.88E-08	1.50E+02	1.92E-10	2
2378-Tetrachlorodibenzo-p-furan	ΝΑ	NV		na	AM	2.00E+00		na
12378-Pentachlorodibenzo-p-furan	AN	N		па	ΑN	NA		na E
23478-Pentachlorodibenzo-o-furan	Ϋ́	N<		na	AN	7.50E-02		БП
1234/8-Hexachlorodibenzo-p-furan	7.11E-12	N<		па	1.73E-10	7.50E+00	2.31E-11	2
1236/8-Hexachlorodibenzo-p-furan	₹.	>N		па	NA	2.50E+00		па
123/89-Hexachlorodibenzo-p-furan	₹ Z	N		na	NA	AA		na
234678-Hexachlorodibenzo-p-furan	AN	N		na	ΑN	1.50E+00		Па
1234678-Heptachlorodibenzo-p-furan	3.82E-11	NV		na	2.32E-10	AN		na
1234789-Heptachlorodibenzo-p-furan	۸	NV		па	ΑN	AN		e L
Octachlorodibenzofuran	1.95E-11	NV		ā	4.75E-10	3.00E+02	1.58E-12	2
Energetics								
Nitrobenzene	ΑN	2.09E+00		na	A A	1.51E+04		l a
2-Nitrotoluene	ΑN	3.65E+01		па	ΑĀ	NA		L BG
3-Nitrotoluene	ΑN	3.65E+01		na	NA	ΑN		en en
4-Nitrotoluene	NA	3.65E+01		na	NA	3.37E+04		na

Table D-5: Comparison of Modeled Air Concentrations with Health-Based Values - 300-meter location

		Cartridge	., 5.56-mn	Tun JODIC	n Tungsten Ba DODIC: A059	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	2)	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиte} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
Nitroalycerine	¥	4.47E-01		па	ΑĀ	ΑΝ		na
1 3-Dinitrobenzene	¥	3.65E-01		na	¥	3.00E+03		na
2.6-Dinitrotoluene	¥	3.65E+00		na	NA	6.00E+02		na
2.4-Dinitrotoluene	¥	7.30E+00		na	NA	6.00E+02		БП
1,3,5-Trinitrobenzene	¥	1.10E+02		na	ΝΑ	3.00E+04		na
2.4.6-Trinitrotoluene	Ϋ́	2.09E-01		na	ΑN	2.50E+04		na
RDX	Ϋ́	5.69E-02		na	ΑA	NA		na
4-Amino-2,6-Dinitrotoluene	¥	N/		na	AA	AA		na
2-Amino-2,6-Dinitrotoluene	₹	N/		na	¥	1.50E+04		na
Tetryl	ΑN	3.65E+01		na	¥	NA		па
HMX	¥	1.83E+02		na	¥	NA		na
Pentaerythritoltetranitrate	Ϋ́	N		na	¥	5.00E+01		na
Dibutyl Phthalate	ΑA	3.65E+02		na	¥	1.50E+04		па
Dioctyl Phthalate	AN	4.47E-01		na	¥	1.00E+04		na I
Diphenylamine	NA	9.13E+01		na	₹	3.00E+04		na

Footnotes:

NA: Not applicable because compound was not detected.

na: Not available because health-based sceening value is not available or not applicable if compound was not detected.

NV: No value available.

C_{chronic}: Chronic time-averaged concentration

HBSL: Chronic health-based screening level

C_{acute}: acute concentration

ATV: Acute toxicity value

	Cartrid	ge, 5.56-mm Tung DODIC	Cartridge, 5.56-mm Tungsten Ball, M855 (M16A2) DODIC: A059	M16A2)
	Cchronic	Cchronic	Cchronic	Cchronic
Compound	(hg/m³)	(hg/m³)	(hg/m³)	(µg/m³)
	Aliphatic:C<=8	Aliphatic:C>8	Aromatic:C<=8	Aromatic:C>8
Benzene	٩N	NA	4.99E-02	AN
Heptane	6.40E-06	NA	AN	NA
Toluene	ΑN	AN	2.27E-03	NA
Styrene	ΑΝ	NA	ΑΝ	8.08E-04
Propylene	8.55E-03	AN	ΥN	NA
naphthalene	ΑΝ	AN	AN	1.15E-03
naphthalene	ΑN	ΑN	ΨN	9.05E-04
acenaphthylene	AN	AN	AN	4.56E-05
Acenaphthene	NA	۷N	NA	6.05E-06
fluorene	AN	ΥN	NA	2.27E-05
phenanthrene	ΑΝ	ΑN	AN	2.50E-05
anthracene	NA A	AN	AN	4.73E-06
fluoranthene	NA	NA	NA	2.84E-05
Total (µg/m³)	8.56E-03	00+300°0	5.22E-02	2.99E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	4.46E-07	0.00E+00	1.25E-04	1.43E-05
>1?	no	OU	no	ou
Footnotes:				

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

C_{chronic} = chronic averaged air Concentration

HBSL = Health-Based Screening Level

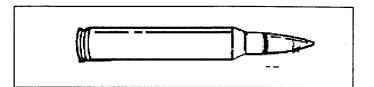
APPENDIX E FACT SHEET SUBMITTED TO AEC

U.S. Army Environmental Center Training Munitions Fact Sheet

M855 5.56-mm Tungsten Ball Cartridge

Department of Defense Identification Code: A059

Breathing air emissions from the M855 5.56-mm Tungsten Ball Cartridge will not impact the health of residents who live as close as 300 meters (984 feet) from the firing location.



To be fully prepared to protect our country, U.S. soldiers must train with many different weapons and munitions, including the M855 5.56-mm Tungsten Ball Cartridge. This training is important because it helps prepare our soldiers for a variety of combat situations. While the Army recognizes the value of such comprehensive training on our installations, we also work hard to ensure the safety and health of surrounding communities.

WILL BREATHING AIR EMISSIONS FROM THE M855 5.56-MM TUNGSTEN BALL CARTRIDGE AFFECT MY HEALTH?

To answer this question, the U.S. Army tested the air emissions that are released when the Tungsten M855 is fired. The information gathered during these tests was then analyzed to determine if there would be a potential for health effects from inhalation to residents who live near training areas. Study results, generated using conservative methods, showed that offsite residents breathing air as close as 300 meters (984 feet or about the length of three football fields) from the firing location are safe from these emissions. If offsite residents are located less than 300 meters from the firing locations, a more site-specific evaluation would be necessary. It should be noted that at most locations, training areas are at least 1,000 meters (over half a mile) away from populated areas and the distance to firing locations may be even farther.

How Was THE STUDY CONDUCTED?

To gather data for this study, the Tungsten M855 was fired from the M16A2 rifle in a test chamber. The air in the chamber was then tested to identify the types and amounts of substances released. About 300 different substances were looked for during this part of the study.

This information was then used in an U.S. Environmental Protection Agency (USEPA) approved air model (a computer program that allows estimation of air concentrations) to determine the amount of each substance to which someone

living near a training site might be exposed. Downwind concentrations were estimated based on a typical use scenario for the Tungsten M855 during training exercises. Since this study did not look at any one specific training area, the assumptions used in the model would, in most cases, predict higher downwind air concentrations than those expected at an actual training site.

These estimated air concentrations were then compared to screening levels established by the USEPA and other federal agencies. If the air concentrations are less than these screening levels, they are considered safe for the general population, including sensitive people such as the sick, elderly, and children.

WHAT ARE THE STUDY LIMITATIONS?

Many steps were taken to ensure that the results of this study are protective of residents who live near training facilities. However, as with any study, this study has limitations. For example, the study does not consider exposure to other types of munitions that could also be used during the same training event. Due to these limitations, conservative model conditions were used to ensure the protection of public health from breathing Tungsten M855 air emissions.

WHAT EXACTLY IS THE M855 5.56-MM TUNGSTEN BALL CARTRIDGE?

The Tungsten M855 is a type of ball ammunition used on firing ranges during training. The Tungsten M855 is a variation of the original M855 and they differ in their bullet composition. The original M855 bullet consists of a copper alloy jacket with a steel penetrator and a lead-antimony slug whereas the Tungsten M855 bullet consists of a copper alloy jacket with tungsten-tin or tungsten-nylon. The Tungsten M855 was developed to mitigate lead contamination problems on test and training ranges while maintaining the combat effectiveness of the earlier version. Both versions of the M855 cartridge are about the length of a man's thumb and can be identified by their green tips.

WHERE CAN I GET MORE INFORMATION?

For more information on the Tungsten M855 or other military munitions, please call the Army Environmental Hotline at 1-800-USA-3845, visit our Web site at www.aec.army.mil, or e-mail t2hotline@aec.apgea.army.mil.